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THE PINES

(An old legend)

BY LEW. R. SARETT

When the rolling waters covered the earth,
The mountains learned to love the waters.
When the whispering ocean rolled away,
The hills grew lonely for its music.
They prayed to the Spirit to send the sea back
To sing again to the mountains.
Then the Father planted the murmuring pines
At the foot of the hills, in the quiet valleys,
To sing of the sea in the winds of twilight;
To ripple and sigh in the breezes of evening.

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FOREST LOSSES ON THE ITALIAN FRONT

BY NELSON COURTLANDT BROWN

U. S. TRADE COMMISSIONER

(Photographs by Courtesy of the Italian General Headquarters)

UNTIL October, 1917, the fighting along the Italian front had been restricted almost exclusively to the mountainous regions. The line, until that date, stretched from the mountains of the Carso region and the upper valley of the Isonzo along the Carnic and Julian Alps to Switzerland. The high divide along the crest of these mountains constitutes the natural boundary between Italy and Austria, and the small region about Trieste and the upper valley of the Trentino constitutes the "Italia Irredenta" for which Italy has largely been in the struggle. Before the unfortunate retreat from Caporetto the Italian front was longer than the entire Western front in France and Belgium, a fact which is generally not appreciated in this country. The total length formerly was about five hundred miles. For the year preceding the signing of the armistice, the length of the Italian front was about two hundred and twenty miles. Fighting in this rugged and precipitous Alpine country was naturally carried on under the most extreme physical hardships. Correspondents who have been on all of the fronts have informed me that the tremendous physical difficulties encountered on the Italian front have far exceeded those of any of the other fronts and one can easily understand this when seeing how the men live and fight and bring up their supplies under those most unusual conditions. The first impression one has is that it is difficult enough to merely exist in that precipitous Alpine region without attempting to maintain a fighting front and to bring up heavy guns and enormous quantities of supplies which fighting in that country involves.

Photograph by courtesy of the Italian General Headquarters

YOUNG AND SCATTERED FOREST GROWTH IMMEDIATELY BACK OF THE LINES ON THE HIGH ASIAGO PLATEAU—PURPOSELY LEFT TO PROTECT MEN AND SUPPLIES GOING TO AND FROM THE FRONT LINE TRENCHES. IT WAS PRACTICALLY WINTER THROUGHOUT THE YEAR ON THE HIGH ITALIAN ALPINE FRONT WHERE A CONSIDERABLE PART OF THE LINES WERE FROM 6000 TO OVER 9000 FEET IN ELEVATION.

For the last year of the war the Italian front ran partially across the flat Venetian plain, the Piave River forming the boundary from the Adriatic Sea to Valdoppiana, where it crossed the Piave River and rose sharply from the flat plain to the higher altitudes of the Alps. There is a most abrupt change from steep mountain topography to the flat plains,

Photograph by courtesy of the Italian General Headquarters

ITALIAN INFANTRY AWAITING THE ORDER TO ADVANCE TO THE COUNTER ATTACK ALONG THE RAILWAY NEAR NERVESA ON THE MORNING OF JUNE 24, 1918, JUST AFTER THE AUSTRIANS HAD CROSSED THE PIAVE RIVER IN THEIR ATTEMPT TO REACH VENICE, PADUA AND MILAN. SOME OF THE BITTEREST FIGHTING OF THE WAR TOOK PLACE HERE AND AFTER TWO WEEKS OF CONSTANT STRUGGLE THE ENEMY WAS FINALLY HURLED BACK ACROSS THE RIVER WITH AN ESTIMATED LOSS OF 250,000 MEN. DURING THE LOWEST EBB IN THE MORALE OF THE ALLIES, THE ITALIANS MADE A GREAT STAND AND FINALLY WON ONE OF THE GREATEST VICTORIES OF THE WAR.

somewhat similar to the sharp rise of our own Rocky Mountains from the flat Colorado prairie. The line crosses Monte Grappa, Monte Rossa, dips down across the Val Brenta, crosses the high Asiago Plateau, dips once more in the double valley on each side of Monte Cimone and across Lake Garda, then rises across the highest parts of the Alps, including the Posilipo and the Posubio, to the Swiss border.

Through the kindness of the Italian war officials and the General Staff it was my privilege to investigate the conditions along practically the whole Italian front, including both the lines along the flat Piave River plain and the higher mountain country as well. Captain Scaravaglio, of General Headquarters, proved to be not only a courteous and gracious host but a most intelligent and well-informed officer on the conditions at the front. He had summered and tramped over a good section of this mountainous country. He said the whole mountain front had never been a heavily forested section. The upper slopes contained scattered stands of silver fir and Norway spruce, while the lower slopes, particularly in the gulches and ravines, contained open stands of chestnut and oak. There was a good deal of young growth and middle-aged timber, and sporadic attempts had been made at reforestation on the more favorable locations. In some of the upper valleys, particularly on the Asiago Plateau, there were good stands of silver fir and Norway spruce, running from eight to twenty thousand board feet per acre or more.

As a result of continual fighting and heavy artillery bombardment, the whole mountain front has been practically cleared of all evidences of timber growth, in many cases the upper soil being so dotted with shell holes that not a living plant is in evidence. Stumps of trees here and there give evidence of former stands of timber and shattered and broken trunks stand out like skeletons against the sky, the only remains of former timber growth.

The whole mountain section immediately appeals to one as being the most urgent subject for reforestation and it will require considerable effort and much money to bring back this beautiful mountain region to even the sparsely forested condition which it presented prior to the war.

Along the Piave River front, the country on both sides is one of the most fertile agricultural regions of the world, as the crop statistics substantiate, so that generally speaking, there has been little forest destruction. While on the battlefield of Montello a few days after the Austrians had been repulsed with great losses from their advance beginning June 15 across the Piave, an excellent opportunity was given to study the effects of shell and gun fire in an old chestnut grove back of the little village of Nervesa which had been used

Photograph by courtesy of the Italian General Headquarters

A COLUMN OF AUSTRIAN PRISONERS, GUARDED BY ITALIAN SOLDIERS, PASSING THROUGH ONE OF THE PICTURESQUE OLD WALLED TOWNS BACK OF THE PIAVE FRONT EN ROUTE TO CENTRAL ITALY FOR VARIOUS KINDS OF EMPLOYMENT. THE ITALIAN GUARDS MAY BE DISTINGUISHED BY THEIR STEEL HELMETS.

as the point of crossing on pontoon bridges by the Austrians. The trees had been torn to pieces as if a combined hurricane and electrical storm which had hit every tree, had recently destroyed the whole section. When a shell hits a tree the contact fuse causes an explosion and the shattering of the trunk or limb in both directions so that a severe splintering effect is the result. On Monte Grappa, which is the keynote of the whole mountain front, acre after acre has been literally "chewed up" by successive bombardments until the whole surface was a mass of shell holes. Near Monte Cimone not only the picturesque little Alpine villages but nearly every living thing in the form of a tree of any size has been destroyed as well. West of Lake Garda, the front was commonly above timber line at elevations of from 6,000 to 9,000 feet above sea level. Little damage to forest growth consequently is evident in those sectors.

Reforestation strikes the imagination at once as being the only salvation for this situation. The land is too rough and rugged to be suitable for agriculture and much of it is so rocky and precipitous that it is not even suitable for development into a grazing proposition. Before the war many parts of Italy were in serious need of reforestation but now that the war is over Italy should devote a large share of her efforts along the lines of reforestation in the devastated forest regions overlooking the fertile valley of the Veneto.

THE FRONT LINE OF TRENCH ON MONFENERA, AN OUTLYING RANGE FROM MONTE GRAPPA, THE KEYNOTE OF THE ITALIAN MOUNTAIN FRONT. THIS HILL WAS FORMERLY FAIRLY WELL FORESTED. SCANT REMAINS OF TREES ARE SEEN IN THE RIGHT BACKGROUND. IN THE DISTANCE IS THE PIAVE RIVER, FLOWING ACROSS THE FLAT VENETIAN PLAIN. ON THE RIGHT OF THE RIVER IS THE MONTELLO, WHERE THE AUSTRIANS BEGAN THEIR BIG OFFENSIVE OF JUNE 15, 1918.

Undoubtedly the happiest and most contented in all Italy during the war were the Austrian prisoners. Asked if they wished to go back to their native land, the invariable answer was that even if they had an opportunity to get back, either by stealing away or by exchange of prisoners through Switzerland, they would only be ill-fed, harshly treated, and forced to fight at the front once more. This prospect held out no attraction to these prisoners at all. Especially was this so in the case of the Hungarians, the Czechs, the Slovaks and the Slovenes.

Photograph by courtesy of the Italian General Headquarters

A MACHINE GUN LOCATION ALONG THE FRONT LINES BORDERING THE PIAVE RIVER. THIS IS A COMMON FORM OF PROTECTION FROM MACHINE GUN FIRE AS WELL AS ARTILLERY AND ENEMY AIRPLANES.

It had always been a matter of interest what a country like Italy actually did with several hundred thousand of these prisoners, that is, whether they were kept in barbed wire stockades or employed on some useful and productive work. They are actually found doing almost everything in the way of physical labor throughout Italy. One finds them chiefly on railroad work, on construction of bridges, homes for refugees, clearing land, farm work, and all sorts of forestry work, and saw mill and woods work.

They are always used in small squads of from twenty-five to fifty or sixty and one is surprised at the comparatively small num-

AN ATTACK OF THE ITALIAN INFANTRY ACROSS NO MAN'S LAND ON A HIGH PLATEAU. THE BARBED WIRE ENTANGLEMENTS HAVE BEEN BROKEN OR LOWERED BY THE ARTILLERY FIRE, PERMITTING THE TROOPS TO PASS THROUGH. THE FORMER VEGETATION HAS BEEN ENTIRELY SWEPT AWAY BY GUN AND SHELL FIRE OR CUT OFF AND UTILIZED FOR FUELWOOD, SHELTER, TRENCH TIMBERS AND OTHER PURPOSES, BY THE TROOPS.

ber of armed guards that go with them. It was quite a customary sight to see only one armed Italian soldier guarding a bunch of prisoners. Asked about the danger of escape, almost always the invariable answer was that the men were so happy and contented that there was no danger whatever of their attempting to get away. Their only fear was a possible exchange of prisoners, in which case, there was anything but a pleasant prospect in store for them. The casual traveler in Italy was struck at once with the serious need of reforestation that is apparent almost everywhere. The ever-present rugged mountain topography in the Swiss and Savoy Alps of the north, the Apennines running almost the entire length of the peninsula, the Calabrian range in the south, and the mountains of Sicily present many glaring needs of reforestation. Added to this situation, the Italian forestry officials have been forced to cut many of their splendid forests to meet the great war emergency. Austrian prisoners have, in many cases, been used to reforest these cut-over areas. Many of them have already had experience in reforestation activities in Austria and so are proficient in the work. The Italian forestry officials have adopted an excellent plan, that of replanting immediately all areas cut over, and every effort is made to bring back the denuded areas to a well-timbered state once more. Many experiments have been made in reforestation at the Royal Experiment Station at Vallambrosa, where there are seven nurseries, totaling about eighteen acres, and which have a capacity of about one million plants a year. As a result of these experiments, they have found that *Abies Pectinata* (Silver Fir) will produce the best results. For the past three years, before the war ended, Austrian prisoners had been preparing the seed beds at some of the State forestry stations in the Apennines, as well as doing the actual work of transplanting and field planting. In the seasons of the year when there is no planting or nursery weeding, or other work associated with reforestation to be done, the men are employed about saw mills and in woods work, cutting down the mature timber, and on the work of transporting the logs to the mill, and in road and construction work associated with the general improvement of the forests.

Aside from silver fir, in some locations Norway spruce and Scotch pine are used for reforestation and to a limited extent some chestnut is planted. There is considerable beech on the higher mountains of Central Italy

Photograph by courtesy of the Italian General Headquarters

ITALIAN INFANTRY IN ACTION ALONG THE PIAVE RIVER FRONT BELOW NERVESA WHERE THE AUSTRIANS MADE ONE OF THEIR THREE CROSSINGS IN THE BIG OFFENSIVE OF JUNE 15, 1918. NOTE THE CROOKED CHARACTER OF THE TRENCHES IN ORDER TO RENDER AS INEFFECTIVE AS POSSIBLE ARTILLERY FIRE DIRECTED AGAINST THEM. THE BRUSH IS AISO PILED TO DISGUISE THE EXACT LOCATION OF THE TRENCHES. THE RIVER VARIES FROM ONE QUARTER TO OVER A MILE IN WIDTH BELOW THIS POINT.

but this is always left to reforest itself naturally. For reforestation work, silver fir, spruce and pine seedlings are kept in the seed bed for two years and for three years in the transplant beds. Before the war it cost about six lire, or about $1.20 per 1,000 to produce these five-year-old plants. At that time, labor cost from 75 cents to $1.25 per man per day. The planting alone, before the war, cost about 20 to 24 lire per 1,000 plants, or from $4.00 to $4.80. The total cost, therefore, of the plants placed in the ground would be from $5.20 to $6.00 per 1,000 plants. For the past three years this cost has been materially lowered where Austrian prisoners were used, because the wages paid were comparatively lower and the cost of feeding the men was only about 20 cents to 35 cents a day per person. In setting the plants out in the field on areas recently clear-cut of mature timber, the silver fir plants are placed one and one-half meters apart in every direction, that is, the spacing is not prepared in rectangular shape as is customary in this country. The pine and chestnut transplants are placed only two meters apart. It has been found that planting can be successful in both

Photograph by courtesy of the Italian General Headquarters

AN INTERESTING PHOTOGRAPH SHOWING THE METHOD EMPLOYED IN CAMOUFLAGING A HIGHWAY ALONG THE ITALIAN FRONT WITH BRUSH AND BRANCHES. PLAITED STRAW, WICKER WORK, MATTINGS, AND CLOTH WERE ALSO COMMONLY USED. GREAT QUANTITIES OF LUMBER, POLES AND TIMBERS WERE USED IN THE WORK OF CAMOUFLAGING THE HIGHWAYS, MUNITION DUMPS, ARTILLERY LOCATIONS, ETC.

Underwood and Underwood

TRULY A "NO MAN'S" LAND.

THIS IS THE SHELL-TORN FOREST ON THE PEAK OF MONTE GRAPPA OVER WHICH THE ITALIANS DID THEIR FIGHTING TO STOP THE AUSTRIAN OFFENSIVE OF JUNE 17, 1918. STUMPS OF TREES AND SHATTERED AND BROKEN TRUNKS STAND OUT LIKE SKELETONS AGAINST THE SKY, THE ONLY REMAINS OF FORMER TIMBER GROWTH.

Italian Official Photograph

A HEAVILY SHELLED PORTION OF THE AUSTRIAN TRENCHES AFTER THEIR CAPTURE BY THE ITALIANS. NOTE THE "CHURNED" APPEARANCE OF THE GROUND AND EFFECT ON THE TREE GROWTH OF THE VICINITY.

the spring and fall, but particularly in the Apennine Mountains of Central Italy centering about Tuscany. Planting usually begins in March on the lower slopes, while at the higher elevations, running up to three and four thousand feet, planting is done as late as the middle of April and even as late as early in May. The plan of reforestation calls for improvement cuttings every ten years and at maturity the whole areas are clear-cut and replanted at once.

Silver fir is usually cut when mature at ninety years of age. Beech is cut at from ninety to one hundred and twenty, unless desired at an earlier age for charcoal purposes, and the Scotch pine and spruce are cut at from one hundred to one hundred and twenty years. The officials have decided to plant pure forests, that is, an area is planted with pure fir or pure pine, as it has been determined that the quality is inferior when these trees are grown in mixed forests in that region.

While at Boscolunga, one of the most important State forests along the crest of the Apennine Range between Florence and Bologna, there was an opportunity afforded to see just how the Austrian prisoners worked and lived and felt about their life as captive prisoners in a foreign land. In talking with them they all seemed satisfied with what they were doing, all certainly looked well-fed, and none of them expressed a desire to get back before the war was over. One bright and husky young Hungarian had had two fingers cut off in an accident in the saw mill, but in reply to a question about whether or not he wished to return, he said that he wanted to remain there after the war and get employment in the saw mill if they would take him. The manager said he was one of the best workers about the place and he hoped that he would remain after the war, as he found him one of the most faithful and efficient among those in his employ. The men slept in clean and commodious bunk-houses which reminded one so much of some of those attached to the Ranger stations in our national forests in the west. Each man had a clean, separate bed and the food was the same as that given to the Italian soldiers. A typical daily menu would be about as follows: For breakfast, war bread and coffee (practically the same as is served in all the hotels, that is, without butter, sugar, marmalade or preserves, etc.). For dinner at noon they received a thick vegetable soup or stew, and macaroni, with bread and a little wine. For supper, they received usually "Risotto" or rice, served up in one of the many styles for which the Italian chefs

AN OBSERVER'S LOOK-OUT CAMP IN THE HIGH MOUNTAINS OF THE ALPINE FRONT, PROTECTED FROM DETECTION BY THE ENEMY BY THE SURROUNDING FORESTS. THIS WAS TAKEN IN THE HIGH MOUNTAIN FRONT BETWEEN THE BRENTA AND PIAVE RIVER VALLEYS. IN THE DISTANCE IS SHOWN ONE OF THE DEEP INTERIOR VALLEYS OF THE MOUNTAIN FRONT.

Photograph by courtesy of the Italian General Headquarters

A COMMUNICATION TRENCH IN A HEAVILY SHELLED PORTION OF THE ITALIAN FRONT. THERE WAS FORMERLY A GOOD FOREST GROWTH IN THIS SECTION BEFORE THE WAR. ALL TREE GROWTH NOT DESTROYED BY THE TERRIFIC SHELL FIRE WAS USED BY THE SOLDIERS FOR FUEL PURPOSES, FOR TRENCH FACING, DUG-OUTS, DUCK-BOARDS, ETC.

are famous, bread, coffee and tea, and a dish of vegetables, such as beans, potatoes, or meat hash. One might ordinarily ask if there were no desserts served. However, no sweets, such as cake, pudding, pie, etc., were served anywhere in Italy during the war. The only dessert offered at the hotels was fruit and occasionally some cheese.

By way of contrast with these well-fed, happy and contented prisoners, an opportunity was afforded at Genoa to see how some of the repatriated Italian prisoners returning from Austria appeared. We helped to feed a whole trainload as they came from Switzerland, and the poor soldiers were the most emaciated men that can possibly be imagined. They fairly fought for the food which was rushed to them at the car windows. Another trainload of returned prisoners from Austria stopped a short while later and the food could not be served because the men were in such serious condition that they could not be fed the coffee, chocolate, eggs, sweet chocolate, fruit, etc., which the Red Cross organizations had prepared for them. The men were too weak to rise from their bunks on the train, and the glaring eyes, sunken cheeks, and pallid complexions bore silent witness of their terrible treatment in Austria. We were informed that many of the poor boys died before they reached their destination at the hospitals along the Italian Riviera.

Many acres of land have been reforested in Italy during the war, not only by Austrian prisoners but by women, men past the military age, and by young boys and girls, but after the war throughout Italy there will be a great need for reforestation of these devastated acres and the denuded and bare mountain slopes. No one appreciates these needs better than do the Italian forestry officials themselves and there are plans already under way to provide funds whereby most rapid progress can be made.

By way of comparison with forestry in this country, the situation in Italy is most interesting. The first impression in visiting Italy is the vast resources in timber growth in this country, the great variety and individual size of the tree species, a well defined and supported national forest policy and the

Italian Official Photograph

IN ONE OF THE BEST SPRUCE FORESTS NEAR THE LINES ON THE ASIAGO PLATEAU NEAR THE VAL BRENTA SO OFTEN MENTIONED IN THE COMMUNIQUES FROM THE ITALIAN GENERAL HEADQUARTERS. VERY LITTLE OF THE FOREST ON THE HIGH ALPINE FRONT WAS AS FORTUNATE AS THIS IN ESCAPING THE ARTILLERY FIRE OF THE ENEMY. EVEN THIS FOREST HAD BEEN HEAVILY CUT OVER TO PROVIDE MUCH NEEDED TRENCH TIMBERS, CAMOUFLAGE POLES AND FUELWOOD FOR THE TROOPS.

BARRACKS OF THE ITALIAN TROOPS ON A PROTECTED SLOPE IMMEDIATELY BACK OF THE FRONT "SOMEWHERE" IN THE ITALIAN ALPS. NOTE THE TELIFERRICO USED TO BRING UP SUPPLIES AND TAKE DOWN THE WOUNDED.

most highly developed lumber manufacturing industry, as compared with similar features in Italy.

Forestry in Italy may be described as a direct reflection of her political and economic history. It must be remembered that Italy, although old historically, is young politically, and that until comparatively recent times, she has passed through a rapid succession of political changes which have wrought great havoc not only with her forests, but her industrial and economic development as well. Italy is often regarded in this country as a land of old historical associations, of interesting old Roman ruins, the land of poetry, painting and the opera—a sort of "dream land" which annually attracts its large quota of tourist travel. This impression is quite a natural one, but Italy is much more than is most often associated with it. The war has greatly unified and strengthened the nation, and with the development of her important water power properties and the conversion of her great munition plants to peace-time activities, her industrial future is well assured in spite of the lack of such important fundamentals for development as coal and iron resources.

For many centuries and until the year 1870, Italy was under Austrian and Spanish rule or was largely made of small individual kingdoms, principalities and papal states, which were highly jealous of each other. As a result of these long continued and seriously disturbed conditions, forestry has suffered severely. Early Roman records show that the practice of forestry was considered, and even adopted in some of its primitive forms, in the days of the old Roman Republic as written records of Pliny and Horace give evidence to posterity. Although one is impressed with the small size of trees, and the unsatisfactory condition of a large portion of the Italian forests, there are many evidences still extant which bear witness to the fact that the country was, at one time, well forested. The Italian peninsula is essentially a mountainous section, and the greater part of the entire Apennine Range was once well covered with beautiful forests. For example, in such splendid old structures as the Palazzo Vecchia in Florence, there are many large beams up to 16 x 16 inches in cross-section, and some even as large as 20 x 24 inches, and from 50 to 70 feet in length, which have been in constant service for practically a thousand years.

With the establishment of the present unified Italian Kingdom in 1870, forestry in Italy received considerable attention from the government authorities, but there were many difficulties and drawbacks in the way of governmental control, and the better handling of the forest resources. In the first place, the government was embarrassed with the lack of sufficient available funds, and most of the forests had been so heavily cut over and burned that there was a scant remnant of the original forest cover. Then too, the old practice of cutting the young and growing forests for charcoal had a most

Photograph by Nelson C. Brown

THE HEADQUARTERS OF THE ITALIAN GOVERNMENT INSPECTOR AT ABETONE IN THE FOREST OF BOSCULUNGO. THE FOREST INSPECTOR HAS HIS HOME HERE, AS WELL AS OFFICE. THIS IS A FAVORITE RESORT OF THE ITALIANS DURING THE HOT DRY SUMMERS.

deteriorating effect on the condition of the forests.

Just prior to the outbreak of the great war, however, forestry in Italy received a new impetus with the establishment of a much larger and better organized technical force and provision by the government for a greatly increased appropriation for operation and maintenance.

The total area of Italy, including the islands of Sicily and Sardinia, consists of about 71,500,000 acres, which is equivalent to the combined area of the states of New York and Pennsylvania, Massachusetts, Connecticut and New Jersey. Within this comparatively small area, a population of 36,000,000, more than equivalent to one-third of this country is congested.

Of the total area of Italy, only 17.64 per cent is now covered with forests. Italian forestry officials estimate

Photograph by Nelson C. Brown

A VIEW IN THE LUMBER YARD OF A SAW MILL OPERATED EXCLUSIVELY ON WAR ORDERS IN CENTRAL ITALY. WOMEN WERE COMMONLY EMPLOYED IN YARD WORK OF THIS KIND, AS SHOWN IN THIS PICTURE, OWING TO THE SCARCITY OF MEN. THE LUMBER SHOWN IN THIS VIEW IS BEECH. THE BEST BOARDS WERE SELECTED AND USED FOR AIRPLANE PROPELLERS, THE REMAINDER BEING USED FOR TRENCH TIMBER, BARRACKS, ARTILLERY WORK, AND FOR MISCELLANEOUS NAVAL PURPOSES.

that at least 32 per cent of the total area of the country should be covered with forests. The production of wood is only one of the several important factors entering into the necessity for better forestry in Italy. The maintenance of a continuous water flow for her water power properties, for example, is one of the very most important features. The prevention of erosion on the steep mountain sides, is also an important feature of forestry and its function in Italy. Moreover, the aesthetic side of forestry in Italy has not been neglected any more than in this country. In fact, aestheticism plays such an important part in the national life of the people that the development of her forests along this line, combined with its recreational features, are destined to play a very important part in the future of Italian forestry. Already certain state forests have been set aside and designated as summer resort forests, where cutting is only to be permitted to maintain the forests in best condition, and

Photograph by courtesy of the Italian General Headquarters

A HIGH LOOK-OUT FROM THE TOP OF A LOMBARDY POPLAR ALONG THE ITALIAN FRONT. VANTAGE POINTS SUCH AS THIS MADE EXCELLENT OBSERVATION POSTS TO DETECT ENEMY MOVEMENTS.

they are not to be regulated along the usual forestry principles.

Of the 12,565,000 acres of forest in Italy, which is equal to about the total forest area of New York in this country, a large share is located in the mountains. About 6,700,000 acres are classified as being located in the mountains, and about 3,800,000 acres in the lower hills, the remainder being in the valleys and on the plains. Only 3.8 per cent of the total area of forests in Italy are owned and controlled by the Central Government. This

Photograph by Nelson C. Brown

LUNCH TIME ON THE RESERVE LINE AT LOSSON, ABOUT A MILE FROM THE FRONT LINES ON THE LOWER PIAVE RIVER FRONT. JUST BEFORE THIS PHOTOGRAPH WAS TAKEN THIRTY-FIVE AUSTRIAN SHELLS WERE DROPPED IN THIS VILLAGE DOING CONSIDERABLE DAMAGE TO THE CAMPANILE TOWER SHOWN IN THE BACKGROUND.

is equivalent to only 270,000 acres as compared to the vast area contained in our national forests, which embraces a total of about 160,000,000 acres.

The municipalities and communes in Italy are very important owners of forest property, the total per cent being 43.2, while the private owners, lumber companies, etc., own 53 per cent of the total area. Large areas of forests are still retained by many old ancestral estates which have been handed down through the same family, for the past several centuries. On some of these estates

Photograph by courtesy of the Italian General Headquarters

DURING A LULL IN THE FIGHTING AT ONE OF THE ITALIAN BATTERIES BELOW CAPO SILE IN ADRIATIC TIDEWATER. ON THE LEFT ARE SOME LARGE NAVAL GUNS PROTECTED WITH SAND BAGS, ETC. THE ITALIAN OFFICER ON THE RIGHT IS PROFESSOR DINO BIGONGIARI OF THE ROMANCE LANGUAGE DEPARTMENT OF COLUMBIA UNIVERSITY WHO WENT BACK TO ASSIST HIS NATIVE LAND ON THE OUTBREAK OF WAR. BACK OF HIM IS AN OUTDOOR DINING ROOM PROTECTED WITH CAMOUFLAGE AND THE WRITER STANDS NEXT TO HIM.

the forests are being handled on scientific principles of forestry, but most of them present an exceedingly poor appearance.

The number of tree species in Italy is probably greater than in any other country in Europe. All of the trees found in the Mediterranean section are to be seen in Italy, whereas on the higher elevations, tree species which are commonly found in Northern Europe, in such countries as Norway, Sweden and Finland are frequently found. The greatest variety is among the hardwoods. But the total variety of species does not compare with those found in this country. For example: It is estimated that there are at least 500 separate and distinct tree species found in this country, whereas in Italy, there are only about sixty. As against about fifty important commercial species, in this country, there are only about eight in Italy. The hardwoods, broadly speaking, occupy 89 per cent of the total forest area of Italy. A good share of this is oak and chestnut forest, the size and general appearance of which is very disappointing to one familiar with the splendid virgin hardwood forests found in the Appalachian and lower Mississippi Valley sections in this country.

The conifers or soft woods occupy only 6.9 per cent of the total forest area. On this very small area, however, the very best part of the commercial lumber is contained. In fact, some of the soft woods are the only trees which grow to a size comparable in diameter and height to some of our better soft wood stands in this country. These are limited to the higher elevations of the Apennine Mountains and the Alps of Northern Italy. In these limited sections, silver fir and Norway spruce are often found up to 140 feet in total height, and sometimes, from 40 to 50 inches in diameter. Stands of silver fir planted 100 years ago produce 75,000 to 100,000 board feet per acre as a maximum. Some limbwood and tops for fuelwood and the manufacture of charcoal are also yielded from these heavy stands. The remainder of the forest area of 4.1 per cent is made up of mixed hardwoods and soft woods. It is very evident, therefore, that the two seldom grow together.

The oaks are the principal hardwoods found in Italy and there are four species, namely, two white oaks, one

Photograph by Nelson C. Brown

THOUSANDS OF SILVER FIR LOGS CUT CLEAN ON ONE OF THE ITALIAN NATIONAL FORESTS, ALONG THE CREST OF THE APENNINE MOUNTAINS. BEFORE THE WAR THIS FOREST WAS CONSIDERED SO REMOTE AND INACCESSIBLE THAT THE LUMBER COULD NOT BE MARKETED AT A PROFIT. WITH THE USE OF HUNDREDS OF MOTOR TRUCKS AND AN OVERHEAD CABLE SYSTEM, THESE LOGS WERE BROUGHT DOWN AND UTILIZED FOR THE WAR PROGRAM. BEYOND THE FALLEN LOGS AND BEFORE THE YOUNG STANDING TIMBER MAY BE SEEN ROWS OF YOUNG TREES PLANTED IN THE SPRING OF 1916 AFTER A "WAR CUTTING" HAD BEEN MADE.

red oak and one live oak. Cork oak and a few other oaks of little importance, are also found, but, aside from the cork oak, are of negligible value. The two white oaks are the Quercus sessiliflora and Q. pedunculata. The red oak is the Q. cerrus, and the live oak is the Q. ilex. Most of these oaks seldom attain a diameter of 20 inches or a total height of 70 feet. Probably 40 to 60 per cent of the total area of oak forests are periodically

cut off at an early age, for the making of charcoal which is in heavy demand in Italy.

The demand for charcoal is probably the greatest single factor preventing better forestry in Italy. Sprout forests of only from fifteen to thirty years of age are frequently cut off for charcoal, and the trees are seldom permitted to grow large enough to yield lumber.

Silver fir and Norway spruce are, next to oak, the most important producers of lumber and forest products in Italy. There are a few fir forests in Calabria, in the toe of Southern Italy, which have been so remote from transportation facilities that the cost of cutting and transporting them to market was greater than the cost of importing lumber from foreign sources. The silver fir and spruce forests are restricted to the higher elevations of the Apennine Mountains and the Alps, bordering Switzerland and Austria. Although restricted in area, these forests grow to such splendid height and size, and so densely, that they are the most important forests from the viewpoint of lumber production in all Italy. Some of the most dense and heavily timbered forests in all

Photograph by Nelson C. Brown

A HAPPY, SATISFIED, WELL-FED HUNGARIAN PRISONER WORKING ON ONE OF THE ITALIAN STATE FORESTS HIGH UP IN THE ALPINE MOUNTAINS OF TUSCANY.

Europe may be found at an elevation of about 2,000 feet at Boscolungo, Valombrosa and Mandrioli. The spruce is the same tree (Picea excelsa) which is so important in lumber production in Sweden, Finland and Northern Russia, and which is widely sold in the English lumber market under the name of white wood. In general characteristics and properties, it very closely resembles the Adirondack or Canada spruce. It has been widely planted in this country for both commercial planting and for decorative purposes. The silver fir is very similar to the balsam fir in the Northeast, but it grows to a very much larger size. Its scientific name is Abies pectinata.

All of the trees found growing in Italy which have similar names to those used in this country, are of the same botanical family, but they all differ somewhat in the character of the wood, nature of the leaves, fruit and bark.

There are five varieties of the pine family in Italy. They are found growing chiefly along the shore lines of the peninsula. They are a particular feature of the Italian Riviera where they lend a most pleasing aspect to the already attractive landscape. All of these pines are very similar in general appearance, and seldom attain a height of over sixty feet or twenty-two inches in

Photograph by Nelson C. Brown

FROM LEFT TO RIGHT, THE ITALIAN GOVERNMENT INSPECTOR OF THE FOREST OF BOSCOLUNGO, MR. MARTINETTI OF FLORENCE, MR. CAMILLO PARISINI, CHIEF ENGINEER OF FOREST CUTTINGS FOR THE ITALIAN ARMY, AND PROF. GIUSEPPE DI TELLA OF THE ROYAL FORESTRY COLLEGE AT FLORENCE.

diameter. They yield a soft, light and workable wood which is rather inferior on account of large knots and other defects. They are commonly referred to as "umbrella" or stone pines. Oftentimes the lower branches are trimmed up leaving a short but broad crown which gives the effect of an umbrella. One of these pines is the same Scotch pine, or redwood as it is called in the English lumber market (Pinus sylvestris) which is one of the most important lumber producing trees of Europe, and is exported in large quantities from Norway, Sweden, Finland and Russia. Another is the well-known Cembran pine which is held in very high esteem for wood carvings of all kinds, and more especially for the world famous Florentine frames and woodwork so much of which is made and exported from Tuscany in Central Italy.

Next to the pines, the Italian beech (Fagus sylvatica) is the most important wood produced in Italy. It is a favorite wood used for making charcoal. It is also used for boxing and crating stock, flooring and for fuel wood. In general appearance, it resembles very closely the beech found in this country, but it grows much smaller and is more defective than the beech found in our native forests of Wisconsin and Michigan.

The Italian poplar is regarded very highly, especially for the purposes of making interior frames of airplanes

and for miscellaneous wood work purposes. It is much stronger and heavier than the native poplar and cottonwood found in this country. There are two species of Italian poplar.

It is estimated that there are over 1,000,000 acres of chestnut forests alone, in Italy. It is composed entirely of one species which, in external appearance, resembles the American chestnut, but which seldom grows to such large size. Its greatest utility is in the production of sweet chestnuts of which around 800,000 tons were produced in Italy during the year 1918, and furnished an

Photograph by Nelson C. Brown

A LOG YARD IN ONE OF THE FOREST OPERATIONS FOR THE WAR PROGRAM. THIS VIEW WAS TAKEN IN THE UPPER CASENTINE VALLEY IN TUSCANY, IN CENTRAL ITALY. NOTHING WAS ALLOWED TO WASTE ON THESE CUTTINGS, THE LUMBER BEING USED FOR BARRACKS, ETC., AND THE SMALL PIECES BEING USED FOR FUELWOOD AND CHARCOAL. EVEN THE LIMBS AND BRANCHES WERE USED FOR TRENCH FACING AND CAMOUFLAGE PURPOSES AT THE FRONT.

important part of the Italian food supply. In fact, it may be truthfully said that most of the Italian chestnut is protected and cultivated more for the production of the nuts than for the production of wood.

The larger size chestnut trees are used for poles, piling, vineyard stakes, barrel staves and miscellaneous lumber purposes. Most of the chestnut forests, however, grow on poor, rocky soil above the vineyards and olive groves, and the individual trees are exceedingly crooked, small and mis-shapen. They are not the kind of tree which lends itself readily to production of good lumber for this reason.

Italian larch (Larix Europea) is found only in the Alps of the north, at a very high elevation. It is only found as a scattered tree in the coniferous forests of the Alps and has never played an important part in the lumber markets owing to its scarcity. Its wood is very highly valued, however, on account of its strong, durable qualities.

There is a variety of other woods found in the Italian forests, and only one is of any commercial importance, namely, walnut (Juglans regia). This tree is found growing here and there with other kinds of hardwoods. It is very highly prized as it is a wood of excellent qualities for use in cabinet, high-grade furniture and flooring work. It is even exported to South America where it is held in great demand. It is also used for wood carving, inlaid work, paneling and interior finish.

Other woods are alder, cypress, elm, mulberry, maple, birch, ash and eucalyptus.

Italy is one of the most important lumber importing nations in Europe. It annually brings in about 1,000,000,000 board feet, valued at over $35,000,000 to make up the deficiency of its local supply. During the war this normal importation was practically shut off, and the native forests were depended upon to supply a large share of not only the normal demand, but for the requirements of the war program, which were exceedingly large in Italy. As a result of this situation, the Italian forests have been very heavily depleted, and whereas they supplied nearly half of the total amount of lumber and forest

Photograph by courtesy of the Italian General Headquarters

AN OLD ROMAN MOSAIC UNCOVERED IN DIGGING TRENCHES ALONG THE ITALIAN FRONT IN THE JULIAN ALPS. IT WAS PROBABLY PLACED HERE ABOUT 2000 YEARS AGO TO MARK THE BOUNDARIES OF ONE OF THE ROMAN PROVINCES OF THAT TIME. ROMAN COINS HAVE ALSO BEEN FOUND IN PREPARING TRENCHES ALONG THE FRONT LINES.

products required in the country before the war, it is estimated that the local production will play only an insignificant part in the future.

First, the spruce and silver fir adjoining the battle-front were cut off, and then the oak, beech and chestnut forests of the northern provinces of Lombardy, Venetia and Piedmont. This was done chiefly to save transportation to the front because the Italian railways were very heavily loaded by the necessities of the war program. They were called upon not only to send troops, ammunition and other supplies to the men at the front, but they were also used for the transporting of English

and French troops to ports on the southern coast where they were embarked for points in Macedonia, Mesopotamia and Palestine. At first, only the largest and best trees were cut, but as these became depleted, the secondary and more inferior trees were cut and the work progressed to the central, and even the southern provinces of Italy. Finally even the forests which had been classified as summer resort forests belonging to the state, had to be cut. The sacrifice of these beautiful forests such as Valombrosa, Camaldoli, Boscolunga, and others, severely hurt the Italian pride in their native forests. But

Photograph by Nelson C. Brown

A LARGE STATE NURSERY AT BOSCOLUNGA IN THE MOUNTAINS NEAR FLORENCE. THE SEED BEDS CONTAIN SILVER FIR WHICH AFTER TWO YEARS ARE TAKEN TO THE TRANSPLANT AREAS AND AT THE AGE OF FIVE YEARS ARE SET OUT IN THE FORESTS. ON THE RIGHT IS AN AUSTRIAN PRISONER EMPLOYED IN WEEDING THE SEED BEDS. ON THE EXTREME LEFT IS PROFESSOR GIUSEPPE DI TELLA OF THE ITALIAN ROYAL FORESTRY COLLEGE SPEAKING TO THE FOREST INSPECTOR OF THE DISTRICT. TO THE LEFT OF THE AUSTRIAN PRISONER IS MR. CAMILLO PARISINI, GENERAL MANAGER OF ONE OF THE LARGEST LUMBER COMPANIES CUTTING STATE TIMBER FOR WAR EMERGENCY PURPOSES.

the sacrifice was necessary for the winning of the Great War. The splendid state forests in Tuscany, Abruzzi and even in Calabria, were cut for the maintenance of a big army of 5,000,000 men at the front.

The effect on the Italian forests, therefore, must be very apparent. Italian forestry which was assuming considerable importance prior to the war, has received a serious set back, and damage has been done which will require a century or more to replace.

The personnel of the Italian forestry service, which is known as the "Servizio Forestale," is exceedingly high. It has a number of excellent, trained specialists on various phases of forestry, and it compares very favorably with the service of any of the other European nations. Prior to 1910, the Service received only meager support from the government as the annual appropriations only amounted to $150,000. However, since that year, the annual appropriations were raised to 5,000,000 lire which is equal to about $1,000,000. By way of comparison with our forest service in this country, which has, roughly, about five and a half million dollars for an area of 160,000,000 acres, this is exceedingly good. Since the entrance of Italy in the war, however, in 1915, the annual appropriation was cut to 3,000,000 lire, which is equal to about $600,000. These amounts include the support of the Royal Forestry College at Florence, and two ranger schools. The schools had no students on their rolls, during the war. The Forestry College received an equivalent of about $40,000 annually both before and during the war. It was founded as early as 1869 at Valombrosa, and it continued there at the old monastery until 1911 when it was moved to Florence. The two ranger schools are located at Valombrosa and at Citta Ducali in the province of Abruzzi. The former had 150 students before the war, and the latter, 300.

The organization of the Italian Forestry Service consists of the director general in charge, who has his headquarters in the Ministry of Agriculture at Rome. Under him there are 13 chief inspectors, 47 inspectors, 28 assistant inspectors, 16 head rangers, 175 rangers, 425 brigadiers and 2,400 guards. The Forestry Service has

ON THE ASIAGO PLATEAU A SHORT DISTANCE FROM THE FRONT LINES WHERE SMALL PATCHES OF SILVER FIR AND NORWAY SPRUCE, PROTECTED BY THE TOPOGRAPHY, HAVE SURVIVED THE SHELL FIRE AND CUTTING FOR WAR PURPOSES. NOTE THE GREAT MASS OF BARBED WIRE ENTANGLEMENTS READY TO BE THROWN ACROSS THE ROAD IN CASE THE FRONT LINE IS BROKEN THROUGH BY AN AUSTRIAN ATTACK.

recently announced that wounded soldiers will receive preference for all of these positions in so far as they are physically able to perform them.

During the year 1914, the total receipts from the state forests was 1,309,427 lire, whereas the expenses were only 1,148,371 lire, leaving a net profit of 161,056 lire, which is, roughly, equivalent to about $32,000.

In the management of the Italian State Forests, silver fir has been demonstrated to be the most successful tree. Its chief advantages are that it is easily regenerated; it grows rapidly; it is comparatively free from insect and other attack, and it yields a wood of excellent quality for the lumber market. It is usually cut at from 90 to 100 years of age, and the areas are replanted immediately with five-year old trees. The latter are kept two years in a seed bed, and three years in transplant beds. They are spaced one meter apart each way, and it costs from about 26 to 30 lire, or roughly, from $5.00 to $6.00 per thousand trees for reforestation. An improvement cutting is made every ten years. Since the forestry policy was instituted in Italy in 1867, and down to June 30, 1912, 39,932 hectares or about 100,000 acres of forest land has been reforested at an expense of 15,085 lire, which is equivalent to about $3,000,000 according to the official Italian statistics. The forestry officials have approved a reforestation policy of 81,764 hectares or about 200,000 acres, which only awaits funds for rapid execution. It is estimated that over 1,000,000 acres of forest have been completely destroyed and devastated along the Italian front during the war, and it is believed that the only solution to the difficult problem is reforestation.

To supply her enormous lumber needs Italy can now look to only Switzerland, the United States and Canada. Before the war she imported about 75 per cent of her lumber from Austria and about 7/9 of her wood pulp from Germany and Austria. Switzerland is normally an importer of lumber and can not long keep up its export, so that Italy will probably have to depend upon this country and Canada for all we can possibly send her.

Before the war Italy's home production of lumber was far short of her needs and great quantities of soft wood especially were imported. Since the war the situation has become more serious, all the more so because the war was fought in the precise region of Italy that is richest in soft wood. Not only the damages of war but the uneconomical use caused by the urgency of the demands for lumber for war needs caused the disastrous depletion. Soft woods and poplar in the war zone are said to have been forced to yield two or three times their normal production.

The new provinces to be added to Italy as a result of the war will give her new forestal riches, especially as most of the wood in the added territories is of the kind not common in Italy. But it is hardly sufficient to decrease even slightly the gravity of the situation and Italy must import large quantities of lumber in the coming years because of the increased demand of her industries and the necessity of rigorously sparing the forests situated within her old confines to allow them time for regrowth.

N. L. CAREY, forest assistant in the Olympic National Forest, has discovered what he believes to be the largest spruce tree in the world. It measures 16 feet in diameter 4½ feet above the ground. It is on the south side of the Solduck River. The top was broken off 150 feet above the ground.

THE FIR

By Donald A. Fraser

O Forest Fir!
Standing so straight and so slender,
Gigantic, yet slender;
Spreading thine arms so benignly
In benison over thy kindred,
Why dost thou shiver and groan,
And moan like a spirit in anguish?
Dost hear the far axe being sharpened,
The blades that shall sever thy heart-strings,
And lay thee a-low in thy glory?
Moan not; for to all comes a season
When Earth calleth back what was borrowed;
So he who shall shatter thy life-dream,
In turn shall his life-dream be shattered.
Then moan not, O Forest Fir slender,
And groan not in anguish and sorrow;
But stretch forth thine evergreen fingers
And touch on the strings of the wind-harp
A melody sweet and caressing,
A pean of love and forgiveness;
And breathe o'er the world so ungrateful
Thy resinous odors of healing,
Right on till the axe shall incise thee.
Perchance when thy last groan is uttered,
And the thunderous crash of thy death-plunge
Shall melt in the aisles of the forest,
That God will begin a new era
For thee, a new lease of achievement;
And thus thy proud death shall accomplish
Far more than thy bourgeoning life-span,
O Forest Fir,
Standing so stately and slender!

THE GUARDIAN OF OUR FORESTS

BY ALICE SPENCER COOK

"UNCLE Sam's handy man" is what we call the forest ranger, the man who guards our National Forests, for his duties are probably more varied than any other officer in the Government Service. His life and activities are much of a mystery to the average citizen. Even in the western States where the National Forests are largely located, little is known of the men who protect the timber resources of the State, watch over the water courses and the game and stock, and patrol in general the great mountain reaches.

When the Service was new, the only qualifications demanded of him were those of a woodsman or a cowboy. "Book learning" was unessential, so long as he could swing an ax and ride a horse. He blazed the trail through untrod forests and over unnamed peaks, but he was not up on the "technical" stuff and, with the buffalo and bison, the pioneer and his prairie schooner, he had to go. The advancing strides of civilization demanded a scientific knowledge of the woods and engineering ability and forest schools soon turned out the requisite number of these college trained men, whose education in the theory of the management of the forest, supplemented by practical experience in various lines of woods work, made them capable of performing their varied duties.

So the ranger has gradually developed from the uneducated, though faithful, frontiersman, to the clear-eyed, weather-bronzed young fellow with a vast amount of initiative and tact, a combination of cattleman, surveyor, timber cruiser, fire expert, telephone linesman, and, most of all, a first-class woodsman.

Photograph by H. T. Cowling

HERE IS FOUND REALIZATION

Easy of access, what could be more soul-satisfying to the lover of beauty than this view of Lake Chelan at evening? Lake Chelan is in the Chelan National Forest, guarded by our rangers.

The little old weather beaten shack has given way to a substantial cabin, furnished by the Government, and costing about $1,000, which is situated near the largest town in his district. These cabins, which are invariably painted green and have "Old Glory" floating above them, are very attractive looking. In addition to a rent-free cabin, the ranger is furnished with all the fuel he requires, so he is never harassed with the coal bills which bring furrows of care to the brow of many a city dweller. He must, however, furnish his own horse, and a horse to a ranger is as necessary as a ship to a sailor; but pasture is furnished by the Government.

Each ranger has charge of about 200,000 acres, and is assisted by guards, who belong to the old school

which demands brawn in addition to brain. One of his duties is to lay out the mountain trails, which he does with great engineering precision, oftentimes, of necessity, through thick underbrush and up steep mountain sides.

He puts in the telephone lines, which, as will be seen later, are absolutely essential in the safe guarding of the forests, and on the forests where there is grazing, he has supervision of the Government grazing permits, which means that he must assist in protecting the sheep from wolf attack, make proper watering places for the stock, and see that the herders move their stock on other grazing lands before the grass is eaten so short that it will not come up again. He must also count the sheep, checking them for loss and for pasturage charge. He supervises in part the timber sales, cruising or making an estimate of the timber, and, after it is cut, scaling it so that the Government will derive the proper income from it.

IN THE DARK WATCHES OF THE NIGHT

A wonderful cloud effect in the forest.

He welcomes the campers who enter his domain, advises them of the safest trails, the best fishing streams, and the happy hunting grounds, which in this case does not mean the Indian's paradise, at the same time warning them, very politely of course, as becomes a model host, not to leave their camp fires burning.

READY TO MAKE CAMP FOR THE NIGHT

The many visitors to the National Forests appreciate the value and necessity of the work done by the forest rangers, ever alertly on guard, day and night.

Near Portland and Seattle, there are two immense national playgrounds, which are open to the public for camping purposes. The public is invited by folders, advertisements, etc., and is more than welcome to camp there for any length of time. For their convenience, the rangers erect, here and there, stone fire places for cooking purposes, and sees that the campers are supplied with quantities of wood for fuel. It is the boast of the ranger that the water in the mountain streams is pure and fresh, and he makes good his boast by keeping the streams free of refuse of all kinds.

One playground, 47 miles from Portland, Oregon, on the highway which extends along the Columbia River, is visited every pleasant Sunday by from 2,500 to 3,000 people, some to spend the day, and some the week-end or longer. They fish, hunt, or wander along the trails back into the mountains, whose wild and rugged beauty is balm to the heart of the city dweller. Frequent signs tell where the trails lead and rude but storm-proof cabins, supplied with fuel, are erected at frequent intervals, as a refuge when lost.

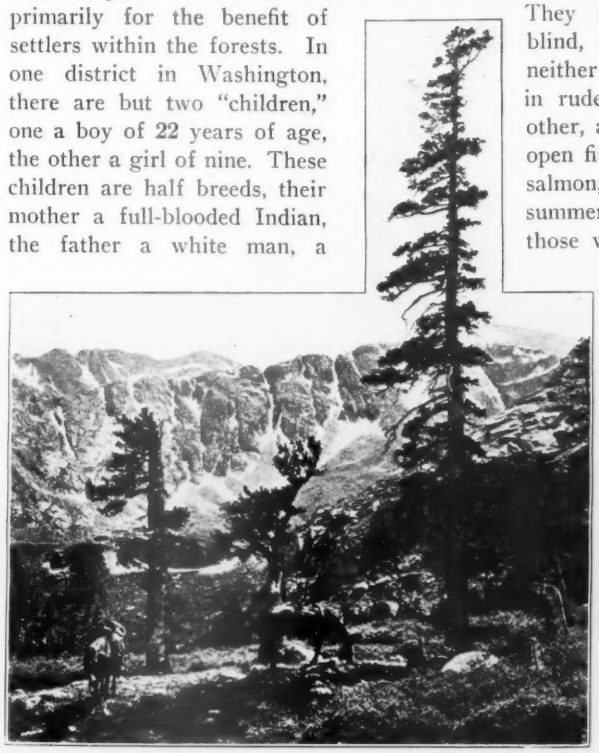
The Government also issues free use or nominal charge permits to anyone who desires to put up a hunting lodge, and is given a piece of land, comprising about an acre, for this purpose. Timber for the cabin is furnished free of charge and is never missed, for in the Northwest there are from 50,000 to 200,000 feet of timber to the acre, and 5,000 will build the average house; there is enough timber on every

acre to build from 10 to 40 houses. These permits are usually taken up by people in Washington and Oregon who wish to spend a few weeks or months in hunting and fishing. The tourists from the East usually take the main traveled roads, instead of the untried trail dear to the heart of the true Westerner.

It is a curious fact that approximately 75 per cent of the rangers are married to school teachers. You will wonder where all the school teachers come from in this sparsely settled region. This is partly explained by the fact that every district has at least one teacher, regardless of the number of pupils. Since 25 per cent of all receipts from the National Forests go to the counties in which they lie, to be used for schools and roads, they can well afford to employ a teacher at an attractive salary. An additional 10 per cent is expended by the secretary of agriculture upon the roads and trails constructed primarily for the benefit of settlers within the forests. In one district in Washington, there are but two "children," one a boy of 22 years of age, the other a girl of nine. These children are half breeds, their mother a full-blooded Indian, the father a white man, a "squaw man," as he is scornfully called in that section of the country. But these youngsters receive individual attention seldom accorded to children in the more populated districts. The teacher lives with the family for the nine months of the school year, in their little wick-i-up, 18 miles from the nearest railroad. This may sound very romantic until one remembers that the Indians in that part of the country are not the "six-foot in their stockings" type, which romance and the movies love to picture. They are short and heavy set, and many of them are blind, owing to their unsanitary mode of living. They are neither energetic nor industrious, and are quite content to live in rude little huts, made by bracing a few logs against each other, and in these huts they live all winter long, with only an open fire to keep out the bitter cold. They live on fish, mostly salmon, which come up the mountain streams in the spring, midsummer and fall, to spawn, but never get back to the ocean, as those which are not caught are dashed against the rocks and killed, or, having accomplished their purpose in life, die a natural death. The Indians dry the fish which they catch by hanging them on the sides of their cabins.

HOME OF A RANGER

Typical ranger cabin in the less mountainous districts, Washakie National Forest, Wyoming.



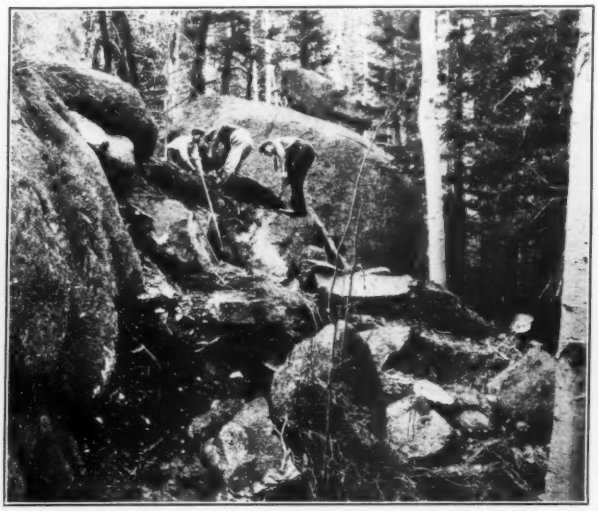
AN UNUSUAL BIT OF SCENERY IN A NATIONAL FOREST

Spruce trees, with crowns whipped into peculiar, fantastic shape by the winds.

RANGERS PLANTING FISH

The rangers co-operate with the State fish and game commissions and are instrumental in planting, in the mountain streams, billions of fish fry, which play no unimportant part in the food supply of the country as well as furnish a means of recreation for city sportsmen.

These mountain streams are also well stocked with trout planted there by the rangers. The minnows are



BUILDING A TRAIL UNDER DIFFICULTIES

Frequently, in order to maintain the proper grade of a trail, it is necessary to remove obstructions of various kinds, such as trees, rocks, and even immense boulders, sometimes larger than the ordinary dwelling house. In the last case, this is accomplished only by the use of dynamite.

furnished by the state fish hatcheries and are sent out in 10-gallon milk cans, which the ranger takes up the streams on eight or ten pack horses. And thus, the supply of trout is renewed each year and is ever abundant for the campers.

In some of the National Forests, the rangers have attempted to secure the utilization of wild fruits in their communities by organizing picnics for the purpose of gathering these fruits. In the mountains of the Southwest, there are large quantities of wild grapes and cherries which make excellent jellies, while in Washington and Oregon, wild strawberries and huckleberries are found in great abundance.

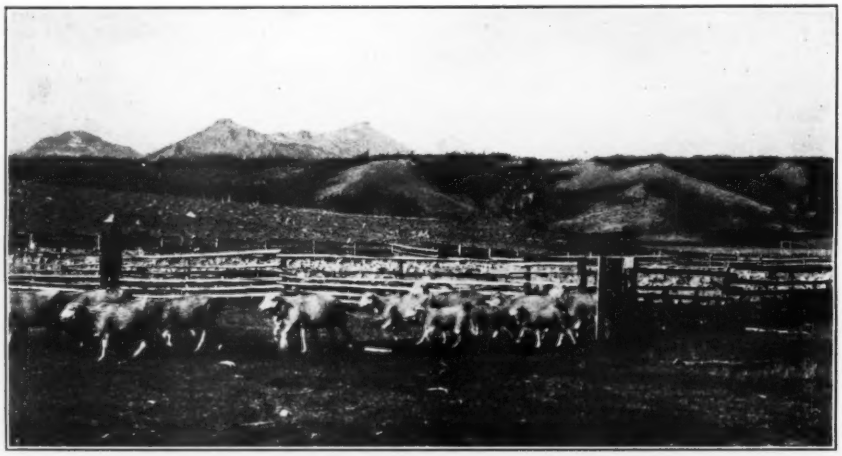
But the chief duty of the ranger is to guard the forests from fires and fight them when they occur. During the course of the fire season, there are sometimes as many as 500 fires in a district, ranging in size from a few square feet to hundreds of acres. Owing to the unusually dry season and the many logging operations now located adjoining national forest timber, the number of forest fires, and danger from them has greatly increased. You will wonder how so many fires could be started in the forests, far from human habitation. These are the three chief causes: railroads, campers and lightning.

It would be impossible to properly guard the forest were it not for that modern miracle, the telephone. There are from 40 to 100 miles of telephone line in each National Forest, extending along the principal tracks

READING SNOW SCALE

This is important since the amount of snow fall determines to a great extent the fire hazard for the following summer, as well as the supply of water available for irrigation purposes.

used by miners, campers, etc., and on up to the lookout stations on the mountain tops. Three of these lookout stations are situated on mountains over 10,000 feet high, which for 2,000 feet from the top are perpetually covered with ice and snow and resemble huge ice cream cones. And there, thousands of feet beyond the timber line, in little cabins, or lookout stations, carried piece by piece up the steep mountain trail, men are stationed all through the fire season to



RANGER COUNTING SHEEP

A band of sheep at Dutch Joe Corral, Bridger National Forest, Wyoming.

watch for the thin spires of smoke which mean the beginning of a forest fire.

When a fire is lighted, sometimes 25 to 30 miles away, he estimates its exact location by means of instruments for that purpose, and then calls up the ranger, who immediately rushes to the scene of the fire all the men at his disposal. If the fire promises to be more than a small one, he telephones or telegraphs to the nearest city for help. In case of a very bad fire, several hundred men are hurriedly gotten together and hastened to the fire. Fire fighting instruments and cooking equipment are already on hand and every one works day and night till the fire is under control. Not long ago, a fire was started by lightning way back in the mountains, 15 miles from the nearest habitation. In the course of an hour and a half after the fire had started, or at least after the smoke had risen through the trees, the ranger had five telephone calls informing him, not only of the fire but also of its exact location. This shows how closely the forests are guarded and explains why most fires are not more serious than they are. But even with the greatest precautions, a smouldering fire left by careless campers, sparks from the smoke-stack and live coals from the fire of a passing train, or a lighted match thrown in some inflammable material in the forest, combined with an east wind, will often wipe out in an hour what nature has taken hundreds of years to create. And not one in a hundred upon reading the startling headlines in his favorite daily, "Millions in Lives and Timber Lost," realizes the brave fight that is made to keep this loss down. But what of the khaki-clad ranger, who with eyes quick and keen, dices with death in a losing game? He is "among the missing," and it's all in the day's work.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association.

BERKELEY, CAL.—By Luther Burbank Intermediate School: Edward Werner, John Gazanago, James Gimbel, Rollie Ramos, Martin Dall, Cladius Vinther.

MIDDLETOWN, CONN.—By Dr. Kate C. Mead: Arthur Leonard Johnson.

NORWICH, CONN.—By W. I. T.'s First Congregational Church: William Morgan Durr; by Mrs. James L. Case: William E. Perry.

WASHINGTON, D. C.—By Mrs. George Combs: The Patriots of the War.

COMMERCE, GA.—By First Baptist Church: Ellis Luthi.

TIFTON, GA.—By Harding Methodist Church: Joe J. Moncrief, Richmond Lovett.

KASBEER, ILL.—By Public Schools: Claus Larson, Walter Paden.

MURPHYSBORO, ILL.—By Public Schools: Will Connelly, Will Richards, Peter Weber, Ernest H. Rowald, Thaddeus Lee.

ROCKFORD, ILL.—By Memorial Tree Committee: Theodore Roosevelt, Soldiers and Sailors of Rockford.

SPRINGFIELD, ILL.—By Enos School: Miss Alice K. Flower.

WHITE HALL, ILL.—By White Hall Senior High School: Francis Grimes; by White Hall Round Table: Charles Martin.

CLAY CITY, IND.—By Betsy Ross Club: Robert Andrew, Edwin Shonk, Samuel Knipe, Jacob Miller, Russell McGriff, Albert Werremeyer.

EBENEZER, IND.—By Miss Cora Grapy: Elmer Andrews.

ELIZABETHTOWN, IND.—By Women's Welfare Club: Kent Voyles.

INDIANAPOLIS, IND.—By Country Club: Lieut. H. C. Colburn, McCrea Stephenson, Reginald Wallace Hughes; by Arsenal Technical High School: Alfred Sloan, Franklin Burns, Ralph Burns, Ralph Gullett.

MUNCIE, IND.—By St. John's Universalist Church: J. R. Hummel.

COUNCIL BLUFFS, IOWA.—By Second Presbyterian Church: Lieut. Richard E. Cook, The Honor Roll.

HARTFORD, KY.—By Mrs. S. O. Keown: Boys from Ohio County, Kentucky.

PADUCAH, KY.—By Robert E. Lee School: Norman E. Lovell, Harry Cornwell.

HARWICK, MASS.—By Park Commissioner: Leslie M. Clark, Valmer H. Bassett, Earle M. Chase, Clarence L. Berry, Josiah D. Nickerson.

MARBLEHEAD, MASS.—By Tree Warden Stevens: Lieut. Charles H. Evans, Irving E. Brown, John A. Roundy, William F. Farry.

RANDOLPH, MASS.—By Stetson High School: Lieut. John B. Crawford, Thomas D. McEnelly, Daniel J. McNeill, Lieut. Thomas W. Desmond, Charles G. Devine.

READING, MASS.—By Reading Park Commission: Ernest H. Leach, Clarence S. Eaton, Lieut. Edward J. Haines, Stanwood E. Hill, Thomas E. Meuse, Timothy E. Cummings, William A. Riley, Corp. Edward Walsh, Ralph E. Morey, William A. White, Sgt.-Major William G. Britain, Jr., Carl L. Coombs, Sgt. Chester G. Hartshorne.

EAST LANSING, MICH.—By Michigan Agricultural College: R. S. Welsh, I. D. MacLachlan, F. E. Leonard, W. R. Johnson, L. Crone, A. F. Edwardsen, W. T. McNeil, H. J. Sheldon, T. W. Churchill, E. E. Ewing, N. F. Hood, D. McMillan, E. E. Peterson, F. I. Lankey, D. A. Miller, L. P. Harris, S. D. Harvey, H. R. Siggins, L. J. Bauer, G. W. Cooper, F. H. Esselstyn, L. K. Hice, C. M. Leveaux, G. S. Monroe, J. S. Palmer, W. H. Rust, O. N. Hinkle, O. C. Luther, L. T. Perrottet, B. F. Smith, G. J. Williams, H. B. Wylie, E. Halbert, S. R. McNair, W. B. Lutz, O. W. Wissmann.

LANSING, MICH.—By Eclectic Society of M. A. C.: George Monroe, Hugh Wiley, Samuel McNair.

MOUND, MINN.—By Public Schools: George Kohler, Martin Shabert.

LAUREL, MISS.—By Dr. W. P. Davis: Lieut. Marvin Stainton, D. S. C.

BOWLING GREEN, MO.—By Reading Club: Erritt Sidwell.

FORT OMAHA, NEB.—By United States Army Balloon School: Maurice A. Reed, Oscar F. Lindh, Frank A. Kaczkowski, Frederick T. Kaulitz.

CAMDEN, N. J.—By Whitman Improvement Association: Walt Whitman.

ELIZABETH, N. J.—By School No. 15: Theodore Roosevelt, Vincent Carroll.

RAHWAY, N. J.—By Mrs. Leillie Burt: John Franklin Burt.

BROOKLYN, N. Y.—By American Association for Planting and Preservation of Trees: Louis Goldberg.

MOUNT VERNON, N. Y.—By Jefferson School: Theodore Roosevelt.

SYRACUSE, N. Y.—By Oakhurst Grammar School: Howard Levy.

CINCINNATI, OHIO—By Cummins School: Robert Schroder; by Linwood School: Albert Mider, Grant Long; by General Protestant Orphan Asylum: Charles Banger, Charles Stratmeyer.

COLUMBUS, OHIO—By the Altrurian Club: Sgt. W. E. Wolfersberger.

NEW LEXINGTON, OHIO—By Mr. A. D. Fowler, Scout Master: Theodore Roosevelt.

"ROADS OF REMEMBRANCE"

IN THE days when all Gaul was divided into three parts the wise men knew the value of good roads. The Appian Way, built in 312 B. C., is still an excellent highway and France today has good roads, for she began building them in 1556. In 1820 Macadam, the English highway engineer, introduced his methods into France. In this country, however, the good roads idea had to pass through the "crank" stage and then the "enthusiast" stage until now the country has a road building program under way that will cost about a half billion dollars, counting state and federal activities. Good roads have suddenly become a business proposition and they should also become a basis for the beautification of the country and something more than a strip of concrete baking in the sun in summer and smothering in the snow drifts in the winter. To avoid this the American Forestry Association has pointed, as a solution, to "Roads of Remembrance"—the planting of memorial trees, memorial groves and even memorial forests at such places as are deemed best. We hear much of memorials but why not let memorial of stone wait until the proper setting along a "Road of Remembrance" can be found?

DEDICATION CEREMONIES

Thirty-six trees were planted at the Michigan Agricultural College in honor of the graduates who gave their lives in the war. A memorial tablet imbedded in a big boulder was unveiled.

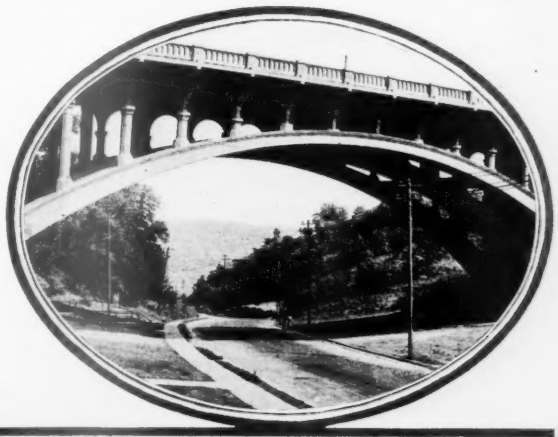
Memorial tree planting on a big scale is planned according to William Carroll Hill, secretary of the Pilgrim Tercentenary Commission, in connection with the three hundredth anniversary of the landing of the Pilgrims in 1920. Daniel Boone died in 1820 and as there is now a Boone Memorial Highway the American Forestry Association has suggested that memorial trees be planted along the road to mark the centenary. There are several proposed highways in honor of Colonel Roosevelt, the leading apostle of the great outdoors. In Great Britain memorial plans are of the widest scope, for they include housing, "Roads of Remembrance," bridges and libraries, all to be included in one country-wide plan or unit.

Here in our own country Minneapolis has the greatest plans for a memorial drive under way, for the Board of Park Commissioners there is planning for fifty years from now. Theodore Wirth, the superintendent, is going ahead with plans by which he claims Minneapolis will have one of the show places of the American continent in 1950. Improvement of the Glenwood-Camden Parkway has been begun and C. M. Loring, "the father of the park system of Minneapolis," has set aside $50,000 for the care of the trees. The vase type of elm is to be used and these trees are now being shaped in the nurseries in order to be ready for planting in the spring of 1921. There will be six rows of trees for nearly two miles and four rows of trees for one mile. The trees will be planted 60 feet apart in both directions. Cincinnati, too, has under consideration a wonderful plan for a memorial drive that includes the widening of Fifth Street in the down-town section, and connecting up with a boulevard now in existence. James P. Orr, who, with F. W. Garber, the architect, was first to suggest the plan is enthusiastic for memorial tree planting.

In Canada, the Ontario Highway Association has plans up for a highway from Ottawa to Sarnia, across the river from Port Huron, where the Victory Highway cuts across Michigan. This in turn connects with the Lincoln Highway which crosses the Jefferson Highway near Ames, Iowa. The Jefferson Highway runs from New Orleans to Winnepeg. Thus it will be seen there are great possibilities for memorial tree planting along an international drive. The tree planting in Michigan is assured and the stretch of the Jefferson Highway in

Louisiana has been planted with Victory Oaks. Governor Pleasant of Louisiana, and a party of motor enthusiasts, have just completed a run from New Orleans to Winnepeg.

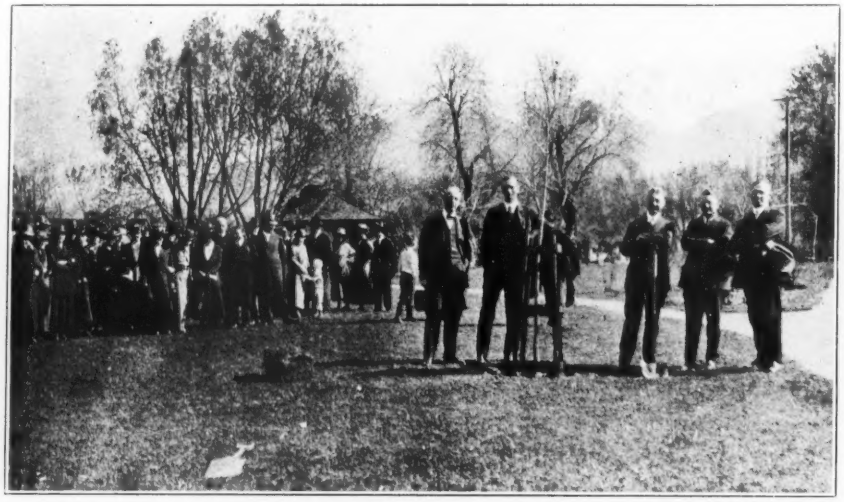
Memorial tree planting this fall will be done on a bigger scale than ever before. Inquiries have been coming into the Association for three months in regard to proper planting and the registration of the trees on the national honor roll. From every section of the country requests are coming for the bronze marker to identify the individual tree. East St. Louis has big plans under way for tree planting, and plans are going forward to interest the entire city by planting memorial trees and thus allowing the citizens themselves to have a big part in beautifying the city. Mayor Henry B. Chase of Huntsville, Alabama, has just informed the Association that the Grace Club, of which Mrs. Owen Graham is president, plans a memorial avenue for fifty-four boys from that county who lost their lives. The town of Southwest LaGrange, Georgia, has memorial tree planting plans under way, so Mayor C. O. Coleman advises. The Bingham, Mexico Chapter of the Daughters of the American Revolution, of which Mrs. S. J. Whitney is the regent, has planted a large number of memorial trees. The Michigan Agricultural College has dedicated 36 trees in honor of men from that school and Prof. A. K. Chittenden has sent in the names for enrollment. The city of Dallas will take up memorial tree



The picture in the center is of the famous elm at Huntington, Indiana, which was saved by changing the plans of the Christian Science Church there. The picture in the oval and the one below, by the Times-Star, show the possibilities of a "Road of Remembrance" planted with Memorial Trees, similar to the plan Cincinnati now has under consideration.

planting on a big scale, Alfred MacDonald reports, and the *Evening Post,* of Worcester, Massachusetts, has taken up the campaign there for a memorial grove. Prof. F. A. Boggess, of the University Hall School, of Boulder, Colorado, reports a very interesting program in connection with the dedication of a memorial tree in honor of four former students who gave their lives to their country. An avenue of flags leading to the tree was a unique feature of the program in which the pupils took part. Schools and colleges are taking up memorial tree planting extensively not only in honor of students and graduates but to mark their own graduation. Thus it will be seen these classes will have trees of their own to come back to at the reunions held ten and twenty years later.

Lester Park, the most beautiful and best known park in Ogden, Utah, was, in April, the scene of a very unusual ceremony in the annals of the Forest Service. The members of the office of the District Forester, located in that city congregated in the park for the purpose of observing Arbor Day and to pay respect to the memory of three co-workers in Forestry who sacrificed their lives in the world conflict. Forest officers are particularly interested in the planting of and caring for living trees, and a fitting method of honoring them was believed to be in planting trees, since two of the men had especially fitted themselves for this particular line of work and the other was an active member of the Forest Service at the time of his death. These three men were Captain Homer S. Youngs, Lieutenant Hubert C. Williams and Forest Ranger Rudolf E. Mellenthin. The first two died in France and the last was killed while arresting a draft evader.



MEMORIAL TREES PLANTED FOR FORESTRY BOYS

District Forester Kneipp, Assistant District Foresters Fenn, Morse, Metcalf and Woods and other members of the United States Forest Service observing Arbor Day and commemorating fallen heroes by planting black walnut trees in Lester Park, Ogden, Utah.

District Forester L. F. Kneipp, who made the principal address, said in part:

> "There are few things that man can do to show his faith, his gratitude and his ideals which are more simple than the planting of a tree—and yet, there are few things that are more effective. A tree is a living memorial, often more enduring than marble or bronze. A tree is a thing of beauty and of inspiration; a living token of the wonder and glory of nature; a symbol of service.
>
> "For the life of a tree is a life of service. It gives a touch of beauty to a barren waste; it enriches the ground upon which it stands and protects it from the destructive elements; it affords the birds of the air a nesting place and shelter from the storms; it tempers the keen edge of the blizzard and the blasting touch of the drouth; its buds and its leaves are marvels of decorative beauty, and its fruits a source of sustenance and life. Even the end of life is not the end of a tree's service; to the contrary, the end of life opens new fields of service and utility which add immeasurably to our civilization and our culture and our happiness.
>
> "Because this is true, it follows naturally that one who loves trees must love beauty and unselfishness; must cherish high ideals and lofty traditions. The mere planting of a tree is an example of unselfish service, for few men can live to enjoy the full fruit of their labor and none can help but share the reward with their fellowmen.
>
> "It is not surprising that when the call came to save the world from the threat of barbarism the men who loved trees, who worked among trees, were quick to respond. It is not surprising that men like Youngs and Williams and Mellenthin gladly sacrificed themselves that their ideals might endure, ideals that to them meant more than life itself.
>
> "'Nothing that we can do to honor their memory; to display our gratitude and appreciation, could be more fitting than that which we are doing today. May we not hope that these trees we are planting here will stand for generations, living memorials, not only to these men who made the supreme sacrifice, but also to the ideals which they cherished and for which they gave their lives?"

At the conclusion of Mr. Kneipp's address, a black walnut tree was planted in memory of each of the three men and a short history of the life of each was given by a member of the Service.

The people of the country are all interested in trees as never before. Through tree planting they will see the value of groves, through groves they will see the value of forests, through forests they will quickly see the value of a national forest policy. The ground work for big things is being put in place by the Association. Every member can have an important part in this work by co-operating. Tell your friends of the work of your association. Keep your editors informed. Take the lead in tree planting in your own community. The American Forestry Association has ready an ideal program for a tree planting day and wherever you see such activities planned, inform those in charge that your association will be glad to help in every possible way. Each member will get out of the association just what she or he puts in it. The opportunity for returns in satisfaction, in the promotion of the community spirit which bloomed during the war, and in the betterment of your country, were never greater than in co-operation at this time in the work the American Forestry Association has before it. Let there be many trees as a memorial to your endeavors.

A NATIONAL FOREST POLICY

AMERICAN FORESTRY MAGAZINE HEREWITH PUBLISHES SOME MORE OPINIONS REGARDING THE NEED OF A NATIONAL FOREST POLICY AND THE KIND OF A FOREST POLICY PROPOSED BY UNITED STATES FORESTER, HENRY S. GRAVES. COL. GRAVES' OUTLINE OF THE PRINCIPLES OF SUCH A POLICY WAS PRINTED IN THE AUGUST ISSUE OF THE MAGAZINE. FORESTERS, LUMBERMEN AND TIMBERLAND OWNERS THROUGHOUT THE COUNTRY HAVE BEEN INVITED BY THE AMERICAN FORESTRY ASSOCIATION TO EXPRESS THEIR VIEWS ON THIS VITALLY IMPORTANT SUBJECT.—Editor.

FOREST ECONOMICS: SOME THOUGHTS ON AN OLD SUBJECT

BY WILSON COMPTON

SECRETARY-MANAGER, NATIONAL LUMBER MANUFACTURERS' ASSOCIATION

NO well-informed American denies the need for a national plan for efficient forest utilization and adequate replacement of timber. But this is only the statement of a *problem,* not of its *solution.* Although there may be general agreement as to the nature of the problem, a veritable encyclopedia of argument and discussion might not suffice to secure agreement as to the answer.

Most of the public discussion of Forest Policy has heretofore originated among the foresters. Some of the policies publicly advocated may represent the general opinion of the profession. "Public opinion," however, we have learned, is not the opinion of the most people but the opinion of those who talk the most, or the loudest. It is therefore of doubtful propriety to attribute to the profession as a whole the sensationalism and faddism of a few men having apparently no permanent attachment to a substantial forestry enterprise, whose concepts of forest economics are apparently quite unsoiled by contact with the facts of industry, and whose self-constituted interpretation of the public interest is vague and mocking.

As a plain citizen, interested in whatever will promote national welfare, I am glad to contribute what I can to clearing away the haze which, it seems to me, has for years enveloped the discussion of future forests and timber supplies, in relation to the industrial life of America. In the discussions of this in recent years, it seems to me, a number of points have frequently been overlooked and other points of doubtful validity have been sometimes taken for granted.

A mere enumeration of these with a brief and rather abrupt explanation is all that a short space will permit. The future permanent supply of standing timber as a raw material for industry is a problem of economics. How much timber, what kinds of timber, where it should be located, what lands should be timbered, and how the timber should be used, cannot be determined by applying principles of forestry. These questions will be correctly answered only by appeal to the experience of business and industry, in the light of all the complex economic needs of the nation and in consideration of the experiences of other countries under similar circumstances. When the nation's timber needs have been determined—then the principles of forestry correctly applied may show how these needs can best be met.

Whether or not it is good forestry to have forests for the sake of having trees, it is not good economics. Forestry cannot safely construct its own kind of economics without considering the nation's needs for the products of all other industries, which are taken from the same land which might otherwise grow trees, and which are made by the same labor which might otherwise make wood products—and then assert that a program of forest renewal based thereon is a correct interpretation of the public interest.

Fourteen Points to Consider.

To anticipate the probable denial by some reader that the points here commented upon have ever been advocated by any conservationist or by any forester, I wish to say that each one has been advocated to me either in personal conversation or in correspondence. I have never had, however, the impression that the views held by some "conservationists" and some foresters actually represented the views of their respective professions as a body.

1. Possession of cheap and plentiful timber is not necessarily a symptom of national wealth.

The great forests of original timber did and do add greatly to national wealth. But a permanent policy that would perpetuate the original quality of merchantable timber or any large proportion of it might, and probably would, involve a national waste through employing soil, capital and labor for a less profitable use when a more profitable use was available. Low prices for forest products at the expense of relative scarcity and high prices for other commodities is not safe public economy.

2. Removal of original forests from the soil of the United States without provision for forest renewal on most of the land thus cleared is not necessarily a national misfortune.

Classification of land in the light of all the complex agricultural and industrial needs of the nation is basic in any rational plan. The scarcity that is most impressive nowadays is not the scarcity of trees, but the scarcity of trees *near to the centers of lumber consumption.* But although impressive it is not conclusive. It is by no means improbable that a comprehensive survey of the needs of forest industries in the light of all other industrial needs would show that the public interest will best be served if the permanent commercial stands of timber are confined to the mountainous country of the Far West, the Appalachian and White Mountain region, and rough country elsewhere. It might be exceedingly wasteful, for example, to maintain under forest more than a small proportion of the cut-over Southern pine lands. Certainly the ambitious South would resent an effort to maintain the South permanently as an in-

dustrial frontier, such as has been its substantial status heretofore.

There is neither reason nor truth in the slogan that: Where a tree is cut another tree should be grown. Such a policy, pursued throughout this land, would entail great waste in the use of the nation's resources. It is the thoughtless cry of those who believe that nature left unaided and undisturbed should be the universal regulator of the economic life of mankind.

3. The fact that old trees are being cut down faster than new trees are growing up does not of itself signify public loss.

It may mean the diverting of some of the productive energies of the nation into more profitable channels than would be offered by the forest industries. The United States is passing through the same evolution of changing lumber requirements experienced by many other countries. During the past 15 years the per capita annual consumption of lumber has declined from more than 500 board feet to approximately 300 board feet, as against 150 feet in Germany immediately before the war, 102 feet in England and 90 feet in France.

4. The virtual disappearance of certain species of timber is not necessarily detrimental to public welfare.

For commercial purposes many species are readily interchangeable. Practically the same things which are now made from a hundred commercial species could be made and the same uses and comforts derived therefrom—from a dozen different species well selected for permanent growth. The elimination from commerce of certain species, provided adequate substitutes are preserved, would involve no necessary impairment of public wealth.

5. Not only is it not *necessarily*, but it is not even *probably* true, that all the lands in the United States better suited for growing trees than for growing anything else, should be used for growing trees.

To use an extreme contrast: If 95 per cent of the land of the United States were better suited for pasture land than for any other purpose would 95 per cent be used for that purpose and we become a nation of herdsmen? Or, if 60 per cent of the area of this country were better suited for growing trees than for agriculture or stockraising, would 60 per cent be so used and the United States then have lumber enough to house five times the number of people it could feed?

But this doctrine is being publicly preached as ideal!

6. The disappearance of forest industries in certain regions because of exhaustion of nearby timber supplies is not necessarily either a local or national misfortune.

Clearing of the land has frequently paved the way for industrial and agricultural expansion which has produced greater wealth than did the forest industries in their prime. It would be a waste of labor, as well as of capital, to attempt to continue an industrial enterprise under conditions which would have returned, as the result of a day's labor, a product worth only $1,000, when the same labor, and the same amount of capital, under more favorable available conditions of employment would have returned a product worth, say $2,000.

Surely there is no public economy in making a wasteful use of capital and of human effort. Yet this doctrine is being publicly advocated.

7. Economically the original timber in the United States is in large part a "mine" and not a "crop."

The business of lumber manufacture is no more the business of growing trees than the business of flour milling is the business of growing wheat. Men who buy timber and operate sawmills are not foresters any more than persons who buy coal lands and operate mines are geologists. The business of the lumber manufacturer is to make boards out of trees and if he does that well he is performing the best public service that his industry can render.

It is not his business to make more trees out of which some one else some day may make more boards. By fortuitous circumstance the lumber manufacturer is likewise usually an owner of land, some or all of which may have greatest ultimate usefulness in reforestation. But this ownership of potential forest land does not put the owner under obligation—moral, social or legal—to undertake the growing of trees when to do so would be unprofitable, any more than the ownership of potential farm land obliges the owner to raise farm crops when he could do so only at a loss.

If the growing of timber is an appropriate private enterprise, which I doubt, the interest of the public (provided it is well informed) in the maintenance of permanent timber supplies will find expression in some form which will result in economic conditions making profitable private enterprise in growing timber. If it is not an appropriate private enterprise the sooner adequate provision is made for doing it as a public enterprise the better. Public agencies would under such conditions experience no difficulty in acquiring from present owners the lands appropriate for use in reforestation.

Public indifference and inactivity cannot, however, encumber the private owner of timber lands with the responsibility for, or expense of, doing something the public should do, but does not.

8. Local shrinkage of employment for labor, caused by vanishing forest industries in certain regions, has been by no means an unmixed evil for labor.

Employment at higher wages has usually been secured by removal to similar industries in other regions, or to other industries in the same region, the higher prices for the products resulting from increasing scarcity of raw material, making the payment of higher wages possible. Temporary dislocation of labor has always accompanied at some stage the industrial use of exhaustible natural resources.

9. The idleness of some of the cut-over timber lands is the inevitable temporary result of clearing the forests from lands upon which maintenance of permanent forest growth would be poor *public* economy. Agriculture, stockraising or other purposes will eventually absorb these lands.

10. The idleness of other of the cut-over timber lands is the inevitable result of clearing the forest from lands upon which regrowing of a new forest would be poor *private* economy.

If the public needs these lands to be reforested before the time when enlightened self-interest—which is the essential driving force of all business and industry—induces the private owner to engage in timber growing, the public should itself engage in reforestation of lands appropriate therefor.

11. The owner of private property in timber lands legally acquired is under no different or greater obligation to use his land permanently to grow timber than the owner of agricultural land is to use the land to grow crops if the growing of crops is unprofitable. The public need for food is at least no less than the need for lumber. Lands on stony hillsides in remote New England are scratched into agricultural productivity which would not be even sniffed at in the more fertile country of the Middle West.

12. The legal obligation upon the owner of property, an obligation that is universal and should be enforced, so to use it as to do no damage to another's property and to do no public injury, does not include an additional

obligation to make a specific positive use of it such as may benefit the public at large although at individual loss to himself.

Failure to reforest cut-over lands is not to do a public injury. On the contrary, *private* reforestation enterprises today on most of the cut-over land would, on the whole, be a public loss because it would involve a relative wasteful use of the nation's resources of labor and capital.

13. If the public is interested in any use of timber lands or of cut-over lands different from that which the enlightened self-interest of the owner may dictate, the public which is the beneficiary should pay the additional cost.

A single class of private property may not be singled out to sustain a burden, in behalf of the public as a whole, which is not imposed upon other classes of private property.

14. The maintenance in idleness of cut-over land is declared to be wasteful.

The larger truth would seem to be that it is wasteful to maintain cut-over land in such state of idleness as does not furnish safeguard against fire and ravage which destroys the natural reproduction of desirable species.

The idleness itself is not always wasteful. In many instances the expenditure of labor upon such land to return it to productive uses is still more wasteful because it withdraws the labor thus expended from other fields to which it could have been more profitably devoted.

Timber and forest economics cannot be dissociated from the intricate and everchanging economic relations of all industry. But it would seem safe to assume that protection against fire and ravage made universal and uniform among all timber properties, so as to involve no unequal burden upon any competitor, will be adequate to guarantee, by natural replacement, the future of the timber supply at least till such time as the permanent forest needs of the United States, and the most economical way of supplying those needs, can be made more apparent.

A uniform national policy of forest protection and of public acquisition of cut-over lands appropriate for permanent forestation should be adequate and practicable. But the duty of the public should be not confused with the public obligation of private industry. The specific public obligation of the lumber industry is to do well its task of making and selling boards. Along with all others in the nation it shares in the obligation to provide adequate forests for future industry. But this is an obligation common to all and not exclusive upon the lumber industry or upon present owners of its raw material. Being so, the burden of provision for the future should be borne by the public which will profit therefrom, and not by a single industry; lest thereby it undermine the very industry whose future it seeks to safeguard. Economic forces which rule all productive activities will overwhelm a forest policy set up in defiance of them.

MANDATORY CONTROL OPPOSED

BY E. A. STERLING, FOREST ENGINEER

IT seems to me that a discussion of Col. Henry S. Graves' "Principles of Legislation" necessary for the enforcement of a national forest policy is premature and that the fundamentals of the situation should first be clearly established.

In taking this attitude I want to emphasize that the desirability of a sound, national forest policy is fully appreciated, and that whatever is said is in keeping with the request for frank comments and with a sincere desire to assist in developing the subject. The complexity of the problem is also realized, and it is largely for this reason that I believe the first step should be the establishment of basic principles, which are sufficiently sane and obvious to be generally accepted, rather than the creation of arbitrary provisions based on proposed legislative action, which it would be extremely difficult to attain unless it was accepted and approved by all concerned.

While this is in no sense an attempt to outline the fundamentals, I will attempt to summarize below a few of the points which seem pertinent.

1. It is frequently stated, without explanation or figures, that private forest lands must be put under long-time management if an adequate timber supply is to be assured. To carry conviction, and show how much and why this private land is needed, would it not be helpful to develop the following:

(a). The probable lumber consumption at the end of, say 30 and 40 years and thereafter, based on the curve of past consumption in relation to the normal increase in population, and the replacement of wood by substitutes.

(b). The sustained annual output from national forests, beginning, say 30 years hence, when the supply will be much more needed than now.

(c). The prospective future output from state forest lands and from the private lands being operated under definite long-time management.

(d). The forest-producing land needed in addition to the above, to give an adequate sustained output.

The object of working out the points under No. 1 and its subheadings would be to ascertain as definitely as possible the amount of forest-producing private land needed to supplement the ultimate supply from sources now assured. It is a major premise in any proposition to know what is to be accomplished. Having established this, the next step is to find means for its consummation, which it would seem could be worked out progressively as follows:

A. The acquirement by states, as far as they can be persuaded to do so by publicity and legislation, of the cut-over and otherwise unproductive lands, which can be acquired at a reasonable price and reforested with promise of success.

B. The much more limited possibilities in the encouragement of municipal forests by acquirement, reforestation and otherwise.

C. The encouragement of private, long-time forest practice by reasonable tax legislation and co-operative fire protection, wherever feasible. This development has been very slow in the past because of the economic factors which prevent the profitable use of capital in such enterprises, but it is reasonable to expect that market and general economic conditions in this regard will change materially in the next 30 years, and that long-lived corporations, and particularly wood-consuming organizations, will take steps to grow successive forest crops to exactly the extent that it can be made profitable.

D. A continuation and extension of the federal purchase of forest lands, both forested and cut-over, and their inclusion under an established technical and administrative policy.

It is my personal opinion that under the existing political and economic situation a policy aimed at the

mandatory acquirement of private lands will fail; (1) because the public has not been convinced that it is necessary; and (2) for the reason that sufficiently strong opposition would immediately develop to not only defeat such a policy, but to jeopardize any forest policy.

One hears a great deal about the enormous areas of cut-over land more suitable for forest growth than agriculture. If this is the case, is it not a logical step to ascertain the amount and condition of such land and redeem it before taking over the commercial timber, which is to supply the demand for lumber? If the private forest lands are to be reduced to a cut-over condition before the government, by mandatory action or otherwise, steps in and imposes methods and systems which will reproduce such forests, why should we not start with the lands which are in a cut-over condition today? To be sure, the expense of regeneration would be less if the timber was cut more carefully to start with, but if we have some 200,000,000 acres which are practically unproductive at present, is it not the truest kind of conservation to put this into productivity first? At the same time, every possible effort might be made in the way of tax and fire legislation to prevent existing forests from becoming waste when cut over, this probability being helped by increasing lumber and stumpage values.

A suggestion, which I certainly hope will not be misunderstood, concerns the co-operative basis necessary in developing an acceptable and practical policy. Since private timberland owners are primarily interested in the policy which has been outlined in your "Principles of Legislation," would not the whole matter be better received, and get a fairer hearing if these private owners were consulted and their opinions and co-operation asked, both as timberland owners and as citizens, who have the best interests of the country at heart?

The gulf which has always existed between business interests and the government, it seems to me, could be narrowed in this case if the timber owners were made more fully cognizant of the situation as regards a national timber supply, and the federal and state officials in turn learn of the responsibilities pertaining to the use and returns on capital invested in timber. The government official can whole-heartedly consider the best good of the people as a whole because his check comes regularly from the United States Treasury out of funds supplied by these same people. The business man, on the other hand, may be equally interested in public welfare, but in order to live and to conserve the capital entrusted to his care, must assume responsibilities and follow policies which are often criticized because the critics have an entirely different point of view.

This expression of my personal views is in the spirit of helpfulness and in keeping with the request for a frank discussion.

PUBLICITY EDUCATION NECESSARY

BY R. S. MADDOX, STATE FORESTER OF TENNESSEE

I UNQUALIFIEDLY concur with Colonel Graves' opinion that there must be a strong national policy in order to control adequately the great issues confronting us today.

Colonel Graves has covered the main problems in a very clear and thorough manner. In connection with this big plan I would suggest that in Tennessee and the entire south, publicity education direct from the seat of the Federal Government, co-operating with the States, is necessary in this scheme. Tennessee is not different from many other States in permitting the neglect of her forested lands and timber problems through lack of knowledge. A sure sentiment is growing but it needs co-operation which culminates in action. This result, I believe, will be achieved most rapidly through a systematic co-operative campaign between Federal and State Governments.

Reclamation of waste lands in Tennessee is one of the big issues in forestry. It is most vital to the State and in addition the results from reclamation projects are more or less rapid and wholly successful. These experiments being carried on in different sections with individual landowners help to make a substantial sentiment for forestry and thus help other forestry problems which we all recognize as of paramount importance. This phase of forestry should be included as a specialty wherever possible in any national policy.

Stimulation of forestry on lands under private ownership as stressed by Colonel Graves cannot be too much emphasized as applied to Tennessee. Here, with the exception of State and Federal owned lands comparatively small in acreage, the holdings are in the hands of individuals and companies. These privately owned lands thus embrace the great bulk of the natural resources and should secure, therefore, direct effective co-operative assistance from the Federal Government.

A LUMBERMAN'S VIEWPOINT

BY EVERITT G. GRIGGS

PRESIDENT, ST. PAUL & TACOMA LUMBER COMPANY

I BELIEVE that a national forest policy should be established by the co-operation of the Forestry Department and practical operators who are continually facing taxation problems and operating costs. So much theory is advanced in matters of this kind that men who are engaged in the business become disgusted with the plans advanced. It certainly would seem that the history of the lumber business, as it has spread across

the continent, should develop a plan which would protect the future supply of our lumber. It is apparent that very little will be done in conserving a product that has no ultimate value, and the tendency in the past has been to criticise lumbermen and operators for organized efforts to control the product or secure a price for a commodity which is so essential.

Forestry is practiced in foreign countries, where the value of stumpage has reached a point that reproduction can be carried out. Where stumpage is so cheap that the private operator cannot see any investment value, and where the cupidity of the tax gatherer forces sacrificing the timber in order to meet the needs of the community, timber is going to be looked upon as a detriment to the land rather than a benefit.

The State of Washington eliminates speculative values in timber, but sells its lands from time to time to operators who must remove the timber within a definite period, say, one or two years. While this eliminates speculative value in purchasing for future rise, yet it forces on the market the entire tract after it is purchased.

In my judgment, the chief problem confronting the timber owner today is the matter of taxation, and if this could be properly solved and a man who could afford to hold timber was enabled to retain it until the demand warrants its cutting, a good many of our problems would be disposed of. As it is now the timber pays a tax every year, and an increasing tax, until it is cut off. No more destructive method of timber holdings could be imagined than this system.

It would seem, in view of the fact that there is such a wide divergence of opinion as to the actual standing timber of the country, that the Government, through its Forestry Department, might employ the Aeroplane Service to take views from above of every representative stand of timber in the country, and in this way formulate a policy and an actual determination as to the value of the timber stands throughout the country. There are a good many things that require the backing of Uncle Sam to finance, and I believe the lumbermen generally, at least the progressive ones, will co-operate in every way with the agencies of the Government if the problems that confront them are approached from a practical viewpoint, and not altogether from theoretical or academic stands.

LEASE HOLDS INTERFERE

BY G. L. HUME

VICE-PRESIDENT MONTGOMERY LUMBER COMPANY, SUFFOLK, VIRGINIA

I DO not believe that under the present existing laws and conditions in this section that the proposition for such a National Forest Policy as outlined by U. S. Forester Graves would be practical, especially in the North Carolina pine belt. This is principally due to the fact that the majority of the timber is held on lease holds, that is, the lumbermen own the timber but not the land. In fact, in only a very small per cent of the cases do the same parties own both the timber and the land in fee.

NO HALF-WAY POLICIES

BY J. E. BARTON, COMMISSIONER OF FORESTRY FOR KENTUCKY

I HAVE read with the keenest interest the address by Colonel H. S. Graves on "The National Lumber and Forest Policy," delivered before the American Lumber Congress at Chicago in April, 1919, and am heartily in support of the remedial measures advocated there. No half-way policies in connection with the establishment of a broad and adequate national and state forest policy will meet the situation. It is necessary to formulate a stiff program and adhere rigidly to it before any progress can be made in legislation which will adequately provide for the perpetuation of our forest resources as a part of the national life of the nation. As has been repeatedly stated, the recent war has certainly demonstrated the weakness and the incompleteness of the policies and programs already in operation. These merely scratch the surface and the broad problem of privately owned timber lands is not touched. There is no reason, with the amount of waste lands at the present time in the individual states and in the United States, that sufficient forest reserves cannot be provided adequately to assure a sufficient supply of timber for the country for an indefinite period, but this is going to be possible only through clear-cut, well defined and vigorous legislation on the part of the states and the Federal Government, and adequate co-operation among all agencies concerned, in seeing that the details of such legislation are conscientiously carried out. So far as Kentucky itself is concerned, there is already plainly evident that the definite change from large permanently located saw mills, backed by large bodies of timber of sufficient size to warrant the expenditure for large plants to small minor operations, cutting isolated bodies of timber or returning to cut inferior varieties left during the initial operations. The interpretation of this situation means that the virgin stands of timber have disappeared or will be gone in the immediate future. Any program looking to the establishment of a policy which will assure the timber resources of the country indefinitely would involve these features:

(1) A complete and accurate inventory of the remaining timber resources of the individual states and of the nation.

(2) Extensive investigations in the matters of yield and growth, upon which, at the present time, there is, over large regions, little or not satisfactory data.

(3) A thorough study of the tax situation, which in large numbers of the states makes not only undesirable, but in most places impossible, the holding of the timber land by private individuals with the view to maintain such lands in forest crops. Forest taxation laws, so far as feasible, should be uniform throughout the states, and certainly throughout definite timber regions, so the same advantages may accrue to all individuals throughout the region, and certainly throughout the individual states.

(4) A very definite plan for the purchase of lands by the states to be retained as a nucleus for extensive state forests in the future, such purchases to be backed by adequate appropriations.

(5) Increase in appropriations on the part of the Federal Government for co-operation with the states under the Weeks Law, looking to adequate fire protection to the forests within the state boundaries.

(6) Increased purchases on the part of the government in the eastern part of the United States particularly of lands for national forests.

(7) Rigid legislation in regard to the cutting of timber, brush disposal, replanting areas suitable for timber crops and other measures necessary to the perpetuation of the forests of the nation.

(8) Regulation of the disposal of timber more in accordance with the law of supply and demand, and less in accordance with the exigencies of local conditions induced by taxation and other features.

The question of freight rates and transportation loom large in the present problem. And such matters as organization within the trade to avoid waste, effective marketing both at home and abroad and to avoid overcutting of present available supplies demand nation-wide study and concerted effort of all interest involved.

A FOREST POLICY BADLY NEEDED

BY ELLWOOD WILSON, PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

A DISCUSSION of the proposals of U. S. Forester Henry S. Graves for a national forest policy is most appropriate.

The time has certainly arrived when the exploitation of forest lands must cease and they must be managed for sustained yield. The cutting over of timber lands, leaving them in an unproductive state, cannot be allowed to continue. The theory that a man can do what he likes with his own property, unless his use of it damages his neighbor or the public welfare must be applied to private owners of timber. The speculative purchase of virgin timber lands, the rush to cut and market the cut, denuding the lands and overstocking the markets, may have made a few timber "barons" but has in no sense been a benefit to the country at large. The time has now come when we must imitate the countries of Europe which have passed through the same crisis.

Whether Colonel Graves' program is just the right one or not is not certain, but the idea of regulation is absolutely right. The timber lands of the country must be kept productive and those lands which are suitable only for tree growth must be made productive. It is a question whether the mere regulation of cutting will make such lands productive, probably in many cases artificial regeneration must be resorted to, but in any case the country at large must take the question up and find a solution for it. The most satisfactory plan would be for the holders of timber to realize the situation and by consultation with foresters initiate steps to perpetuate their timber, thus acting not only in their own interest but in that of the country at large.

It would seem that the whole matter was one of education and that an intensive propaganda should be commenced and carried on. One very good way of bringing home to lumbermen the necessity for better methods is through the banks which advance them money and who hold their bonds and other securities. Boards of trade are also interested, also rotary clubs. Newspapers of course should be reached, especially in localities where timber lands are situated. School children should be reached not only because they are future citizens, but because they often educate their parents. Other methods will readily suggest themselves to those with experience in such work.

TERMS USED IN FARM FORESTRY

THE increased interest in the subject of private forestry, particularly with reference to farm forestry, has brought about the general acceptance of the term "woodland" or "woods" instead of the original one of "woodlot."

A large proportion of the woodland in the eastern United States is in irregularly shaped tracts, spreading out over ridges, ravines, slopes, swamps and poor lands, whereas "woodlot" carries the idea of a small sized, regularly shaped, and, in a large section of the country, fenced tract. When applied to the large or irregularly shaped tracts, it is obvious that the word inadequately describes the conditions. "Woodlot" probably originated in New England and seems fairly well established there. So long as only conditions like those in New England were considered, "woodlot" was accepted as adequate, but in the last few years farm forestry has been developing rapidly throughout the country. The private forestry movement is of tremendous importance not only to the owner of woodland, but to the whole community in which he lives or in which the timber occurs. It is extremely desirable that the success of the movement should not be hindered by the use in forestry literature of a term which does not fit the conditions.

"Woodland" and "woods" are more satisfactory, more expressive, and avoid the possibility of creating confusion in the minds of the people over most sections of the country where the word "woodlot" has never been in local use.

THE USES OF WOOD

FLOORS MADE OF WOOD

BY HU MAXWELL

Editor's Note:—This is the fourteenth story in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

IN some respects and for some kinds of floors wood has no equal. It is attractive in appearance, agreeable to the touch, contains low heat-conducting properties, is nearly impervious to water, and the degree of hardness or softness desired may be secured in a measure by careful selection of the wood. Wide choice of color is possible. The material is easy to cut and work, is fairly light, strong enough to meet most of the demands likely to be made upon it, sufficiently hard to offer necessary resistance, and its cheapness places it within the means of those who need floors.

The range of choice as to cost, figure, hardness, color, and, durability is extensive. When all of these factors are considered, wood is found to head the list of floor materials in this country. If it does not occupy that position in some other countries, it is due to scarcity there. Wherever wood can be had at a reasonable cost, and in adequate quantity, and of suitable kinds, it holds first place as stock of which floors are made. The principal argument against it is its tendency to burn readily. Its use is somewhat limited by fire laws in towns and cities.

DOUGLAS FIR FOR FLOORING

The most important flooring material in the region west of the Rocky Mountains is Douglas fir. It does not measure with some of the eastern flooring woods in hardness, but it is moderately hard and it is so abundant that it has no rival in the western part of the United States, and it also finds its way to eastern states.

It has been many times demonstrated that properly laid wooden block floors resist fire in a remarkable manner. In the Baltimore fire, pavement of such blocks, exactly similar to those laid in floors, passed with little injury through the conflagration. It has been noted, likewise, that the overturning of cauldrons of molten metal in foundries, where floors of such blocks are in use, do less injury to the floors than would be expected. The blocks, under such circum-

stances, burn with such extreme slowness that the floor is not usually put out of use.

Wooden floors formed parts of some very ancient buildings. Occasionally the floors and roofs were of wood while other material formed the walls. Traces of wooden floors are found in some of the prehistoric stone buildings which are supposed to have been erected by ancestors of Indian tribes of New Mexico and Arizona. Such floors may have been only poles and small logs closely fitted together, or two or more layers crossing at right angles; but the floor was an essential part of the architect's plan and of the builder's work.

PACIFIC COAST MAPLE

Most maple flooring is cut east of the Mississippi river and north of the Ohio. It comes from the common sugar tree, generally known as hard maple. Some maple flooring is cut on the Pacific Coast from the Oregon maple. It is not abundant but the flooring is generally satisfactory. It is not quite so hard as the eastern maple.

The evolution of the wooden floor has been interesting and its history long. The neolithic man may have floored his camp with brush cut with a stone knife and spread over the snow or the wet sand to keep his feet out of the water or off of the ice. No records of such have come down from the stone age, but they doubtless existed. Be that as it may, miners in Alaska make brush floors yet to hold their feet above the snow, water, and slush when they pitch their tents for the night's camp during their cross-country expeditions. After packing a heavy load on his shoulders all day, or driving a team of huskies, the traveler in the far northern country selects his night's camping place, and one of the first things he does to make his camp ready is to cut spruce brush, spread the branches for a floor, start a fire in his sheetiron stove, and then remove his boots to give his tired feet a rest. The branches keep his feet dry though snow or water may cover the ground beneath. Thus, what was probably the oldest pattern of wooden floor in the world is still in use, having undergone no change since the days of pleistocene men who hunted the saber toothed tiger in California and the hairy elephant in Siberia.

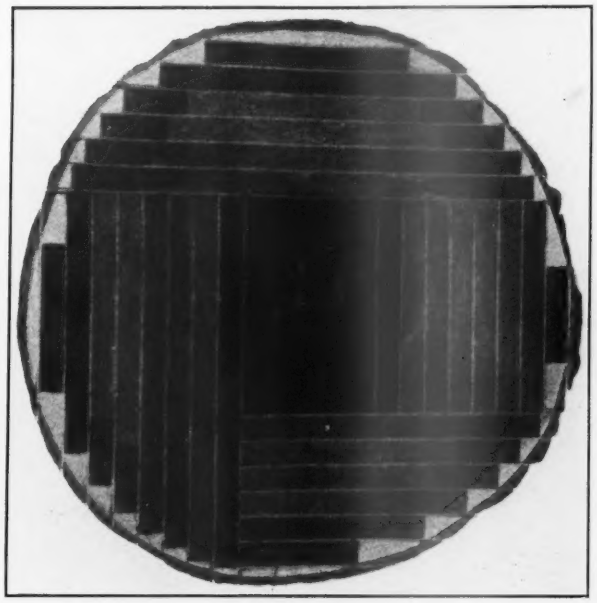
The American pioneers floored their cabins with wood before they had sawmills for cutting lumber. Most of the earliest huts in the forest had puncheon floors, if they had any except the ground, for dirt floors were not then uncommon and they were used when wood was abundant. The surface of the ground was smoothed, tramped hard, and it was frequently the only floor the cabin knew. Rural politicians of early days sometimes liked to parade the information that they were "raised in a cabin with a dirt floor." They seemed to imagine that it was a credit to them, while, as a matter of fact, it was an admission and confession of ordinary laziness, because no man had any excuse for living very long in a cabin with a dirt floor in those times and places of abundant timber.

RED OAK FLOORING MATERIAL

Manufacturers of flooring find much excellent material for their output in the mature trunks of northern red oaks. This wood is not usually as highly figured as the white oak, but it is naturally higher in color and that may offset any deficiency in the figures of the quartered wood. It is frequently well figured.

Puncheon floors were common. They were made of split logs, flat sides up, and smoothed with ax or adz, and fitted edge to edge. In the California redwood country, houses somewhat pretentious in dimensions were often floored with split

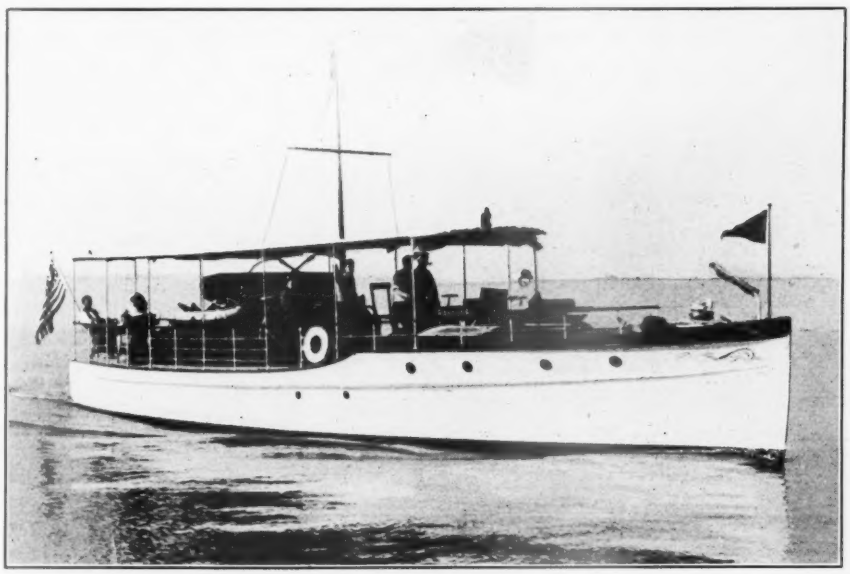
puncheons, not only the first stories, but the second as well. Redwood splits so perfectly that puncheons a foot or more wide and two or three inches thick can be rived in shape nearly as perfect as sawed lumber. In eastern hardwood regions, during the years when split floors were being made, the finest flooring puncheons were of ash, because of the facility with which that wood splits. Chestnut and oak were also favorite puncheon timber. Split boards suitable for floors were often made into doors for the cabins, when sawed stock was not convenient. Those who wanted something a little better than split puncheons for floors, and could not procure lumber from a sawmill, had recourse to the output of the whipsaw operated by hand power. Floors and doors were the first places in cabin building to be filled by sawed lumber. When it became more plentiful, the entire cabin was built of it, but that was not the case at first.



METHODS OF SAWING FLOORING

Flat grain, edge grain and quarter-sawed stuff all come from the same log. The name given the stock depends upon the manner in which the boards are cut. Any wood may be quarter-sawed, but better results are obtained from oak than from most others, because the quartered grain in oak is more easily seen.

It remains true, however, that floors conforming to civilized standards were not common till sawed lumber became available. The older and ruder wooden floors were really makeshifts. Nevertheless, even when after sawed lumber was to be had, some preferred to adhere to the old puncheon size in providing flooring lumber, that is, they wanted planks as large as could be had, and sometimes they were much thicker than necessary. Floors strong enough for factories were put in residences. At the present time, flooring lumber is preferred in strips from two to four inches wide and an inch or less in thickness; but there was a time when the house builder imagined that the wider the flooring lumber, the better. Modern practice prefers the narrow strips. They give less trouble on account of shrinking and swelling. The openings where the strips are joined edge to edge take up the swelling of the wood in damp weather; and the shrinkage in dry weather is distributed among the many cracks and is not much noticed. But the wide flooring boards of many years ago might shrink or swell half an inch per plank, causing unsightly cracks to open and close with the changes of the seasons, or the alternating wet and dry spells of weather. Such behavior did not seem to be regarded as a very serious matter then. An old house in Pike County, Pennsylvania, was torn down after the pitch pine floors had served 160 years and were still serviceable, and the size of the flooring planks amazed the modern mill-men who saw them. The planks were two feet wide and an inch and a quarter thick. Such a floor would be out of fashion now, though when the old Pike County house was built, the wide pine flooring planks doubtless excited the admiration of all who saw them. The length of service to their credit is proof of the excellent wearing qualities of the northern pitch pine, a wood which deserves a better reputation than has been accorded it.

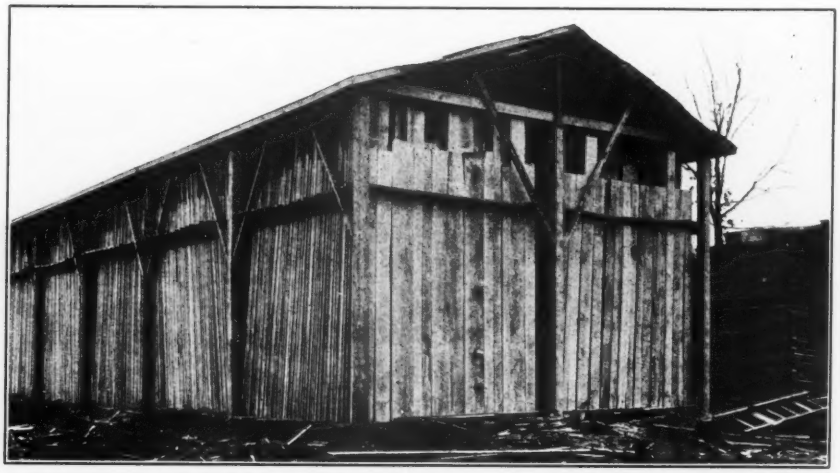


FLOORING ON SEA AS WELL AS ON LAND

A large bill of lumber is required annually to floor the better class of boats, for all flooring is not destined to remain on land. Some of the handsomest floors to be seen anywhere are put in vessels, and wood gives as good service there as in any other situation.

Most modern floors are made of woods moderately hard. No such custom was strictly adhered to in former times. In the white

pine country many floors were made of that extremely soft material. It was a favorite wherever it was known. It was convenient, cheap, and it worked easily. A similar custom prevailed in far western regions in regard to redwood and sugar pine. Convenience, in many instances, counted for more than the length of service that might be expected when the wood was laid in floors. Even a floor of white pine would last several years, and builders seldom looked farther ahead than that.



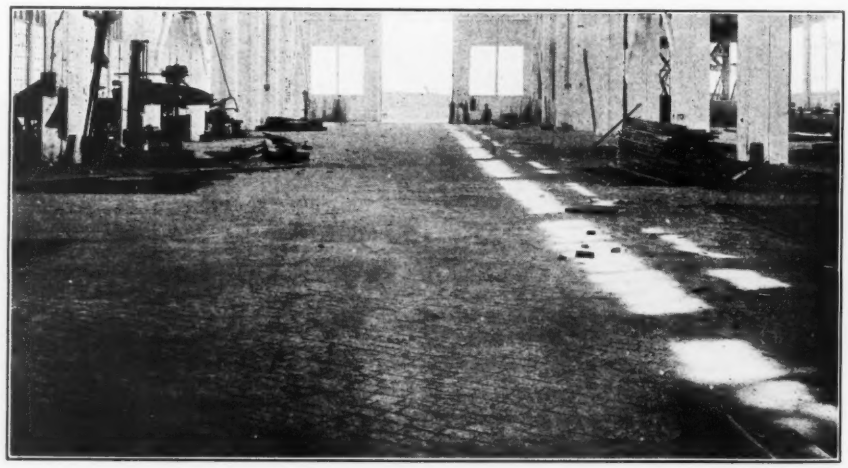
ROUGH FLOORING STOCK

Seasoning is one of the first and most important processes through which flooring is passed in its preparation for the planing mill. It may be dried in kilns in a few days, or it may receive its seasoning in the air. That process takes longer but the seasoning by air is always popular.

Clear white pine is quite soft and as floors it wears rapidly if subjected to much use; but the knots are hard and wear slowly. Consequently, white pine floors become very uneven after a few years. Every knot becomes a high place and the clear wood between wears away, leaving valleys between the knots. Hardwood floors wear more regularly. With them less difference in hardness exists between the knots and the clear wood.

The usual kind of modern floor is known as tongued and grooved, or it may be known as matched. Such has been in use hundreds of years, but there are different sorts of tongues and grooves. Generally the tongue is cut in one edge of the flooring piece, the groove in the other, and these pieces fit edge to edge. Sometimes both edges are grooved and a flat dowel, made as a separate piece, fits in both and serves as a tongue for both. The Egyptians seem to have been acquainted with that method of joinery, so it dates back a long time. Carpenters and planing mill operators have exercised their ingenuity in devising and laying new kinds of flooring. The chief purpose of all is to provide a floor that is practically waterproof, dust proof, airtight, and which will remain solid and presentable under heavy wear and for a long time.

Some floors are laid double, the lower being known as the sub-floor, while the upper layer forms the visible finish. The sub-floor is not seen under ordinary circumstances, and the lumber in its construction need not be selected with a view to its appearance. It is not subject to direct wear and for that reason the wood is not required to be hard, though it must be strong enough to safely carry all the load placed on it. Such is really a two-ply floor, and the boards of the two plies generally cross each other at right angles, or obliquely. The top layer is for show as well as for service, and in most instances a fine hardwood is selected, one that looks well and wears long. This floor may consist of narrow strips matched side by side and end to end, and perhaps of less than half an inch in thickness. It is not necessary to use thick lumber for this top floor because it is supported by the sub-floor, which carries the load. The principal advantage in using thin lumber for the upper floor is that it effects a saving of valuable wood. The thin shell is sufficient.



BLOCK FLOOR IN LARGE FACTORY

The floor shown in the above illustration is made of redwood blocks of 4x6 inches surface and a depth of two and a half inches. It is doing service in a shipbuilding plant on the Pacific Coast. Such blocks have become popular in certain kinds of plants where wear is heavy and the elements of decay are active.

Manufacturers and users of flooring lumber make much use of the term "grain." That word is common with most people who deal with dressed and finished lumber. The term is not understood in the same way by all people who employ it, but the flooring people give

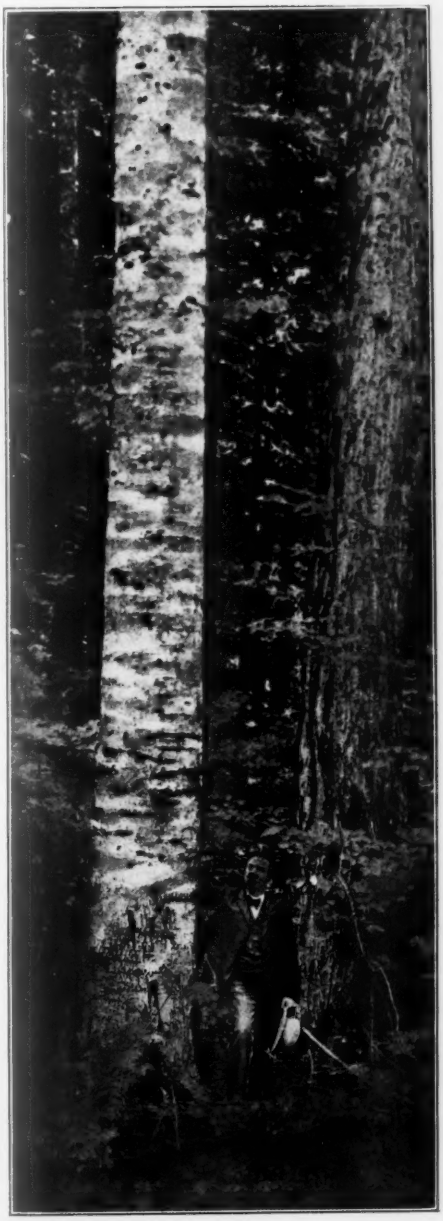
it a precise and definite meaning. Flat grain and edge grain are the most common terms. The former is applied to lumber sawed tangentially, that is, off the side of the log in the same way that the slab is taken off. Edge grain flooring is cut radially; that means, the saw is set to cut from the sap to the heart. The same method is known as "quarter-sawing." When the sawing is done from the sap to the heart, the edges of the annual growth rings are exposed to view in the flat surface of the flooring strips, hence the name, edge grain. In this instance, "grain" is synonymous with annual ring. When an edge grain floor has been laid and is ready for use, the exposed surface, that which takes the wear, shows the edges and not the flat sides of the growth rings. These rings may be visible in the floor as one walks across it. At any rate, they may usually be seen if a careful examination is made. Such is not the case if the floor is laid of flat grain lumber. It presents a different appearance.

(Courtesy Maple Flooring Manufacturers Ass'n)

THE GROWTH OF CENTURIES

A long, large trunk, clear of branches, is a guarantee of age and maturity in maple, and it is from such trunks that the highest class of flooring stock is procured. Trees which will cut a thousand feet of good maple flooring are above the average, though an occasional tree overruns that figure.

One kind may be preferred in one situation, another in another. It is partly a matter of taste, partly a matter of utility. Edge grain flooring is stronger, harder, and wears better, according to claims of some; but this claim is at times open to question. The kind of wood and the rate of growth have something to do with the appearance of the floor. The question as to which is the best is still unsettled, but if one kind were unquestionably better than the other, the public would long ago have found it out, and the best kind would be in use to the exclusion of the other.



(Courtesy Maple Flooring Manufacturers Ass'n)

A BEAUTIFUL BEECH

In the forest this tree often attains a height of 120 to 140 feet, with smoothly rounded bole as symmetrical as the pillar of a cathedral. The bark is light gray. The wood is close-grained, hard and strong and excellent for use as flooring.

Floors of parquetry are built of blocks, strips, and borders. They should not be confused with the block floors which are popular in factories. Those of parquetry are in the best class and may be quite expensive. It would not be wholly inappropriate to call them "wooden tile" floors, because in pattern they resemble tile. Woods of different and contrasting colors are selected, because beauty is the object sought in such a floor, and it is produced by contrasts and harmony. Nothing would be gained if all component parts of such a floor were alike in color.

The woods may have colors imparted to them by artificial means, by employing stains and dyes. As white a wood as holly may become a substitute for as black a wood as ebony; birch may take the place of red mahogany; and yellow poplar may answer for woods of deep

colors; but it is better to use woods which naturally have the desired colors, because stains and dyes may not penetrate much beneath the surface and after a little wearing down by use, the real tones of the woods may appear and betray the counterfeit.

Floors of parquetry may be built in place, block by block, strip by strip, and border by border; or they may be made in factories, the pieces all matched ready for laying in sections. One style of such flooring is called wood carpet, though it is more properly a floor-covering than the floor itself, and that is what is implied when the name carpet is used.

Some floors are not meant to resist much wear. Quite soft woods answer for such. Floors of that sort are oftenest seen in large store windows intended for show, and in alcoves and on balconies where merchandise is displayed and few persons ever walk, except window trimmers, decorators and janitors. Very soft woods like white pine and basswood will stand all the wear to which they are commonly liable in such situations.

SOUTHERN TIMBER FOR FLOORING

Flooring is made in the South as well as in the North, and each kind has a field to fill. The above picture represents a forest scene in Georgia where trees of different kinds grow intermingled, and among them are some possessing great value as flooring stuff. Softwoods and hardwoods grow side by side.

Factory and warehouse floors are of a wholly different kind. They must stand rough usage, and the wear is often excessive. Heavy trucks and barrows trundle over them, and the surface of the boards, if the floors are of lumber, are apt to be splintered by the grinding and crushing action of wheels, or splintered or dented by the fall of heavy bodies. This holds true of warehouses in particular, the floors of which must be strong. To secure this condition, sometimes the sub-floor is made of planks several inches thick, and over this is laid a thinner floor of hardwood to receive the immediate wear. By that arrangement, the surface is kept fairly smooth. In many instances, the flooring in a factory or a warehouse is of edge grain lumber, such being less liable than plain planks to split and splinter under rough usage.

Another kind of flooring common in factories, mills, breweries, tanneries, and stables, is made of blocks, set in a way to expose the end grain to wear. These blocks are similar to those used in paving streets. It is customary to set such blocks on a plank floor as a foundation, and after the blocks are in place, they are treated with a dressing of tar, pitch, sand, asphalt, or some similar material. This fills the interspaces between the blocks and makes the floor solid and tight.

The end-grain of the blocks forms the surface of the floor. It wears better than the side of the block, because the ends of the wood fibers bruise slightly, forming a compact, felt-like mass, resembling a cushion, and this resists wear in a remarkable manner, and at the same time it is sufficiently soft to deaden and neutralize the jolts and jars caused by passing trucks or by the dropping of heavy objects. It is a yielding and semi-noiseless floor, and for that reason it is popular for certain kinds of buildings. The employment of wooden blocks as flooring

material is rapidly extending. Many factory floors are constantly damp, which condition is due to the nature of the business carried on. Under such circumstances, decay is liable to attack wood.

The usual combination of warmth and dampness conduces to speedy decay, unless measures are taken to counteract it. Such measures are well understood and are within easy reach. They consist of preservative treatment with certain chemicals, creosote among others, which retard the development of decay and prolong the floor's period of usefulness. This treatment is possible with all wooden floors, but is oftenest met with in those made of blocks set on end. The preservative treatment is applied to the wood before it is laid in the floor. Wood kept always dry has no occasion to be given treatment to hinder decay, since dry wood does not rot. Some woods in their natural state resist decay much better than others, when they are employed as flooring blocks, and with some of them the application of preservatives may be dispensed with. Usually woods of deep color in their natural state are less subject to decay than are those of light color, but this is not a universal rule. Among woods which in their natural state resist decay well are walnut, locust, redwood, osage orange, cypress, heart yellow pine, catalpa, mulberry, mesquite, and red cedar. These are suitable for flooring blocks for warehouses and factories where the causes of decay are active. Other woods may last a long time if given the proper preservative treatment.

All kinds of commercial woods are occasionally employed as flooring. None is so soft that it cannot fill certain places; none so hard that it is universally rejected. Those as white as balm of gilead and holly fill certain places in this industry, as also do those as dark as ebony and dialamban. Those light of weight, like arborvitæ and white pine, are acceptable as floor material, and no less so are the heavy woods like lignum-vitæ and salmon gum.

It is not possible to quote precise statistics to show the kinds of wood made into flooring and the annual output of each. Statistics have not been kept in a way to show this. Figures relating to flooring production, compiled by the government, include certain other products, and the totals only are given, the separate items not being presented. Tables which contain figures on flooring, contain also such items as siding, ceiling, doors, sash, blinds, and frames for windows and doors, all thoroughly mixed in the totals, and it is now impracticable to separate them.

It is safe to conclude that the leading floor woods are yellow pine, Douglas fir, oak, hard maple, and hemlock. Probably half of all the flooring cut in America is made from the five here named. But the list of flooring woods does not end there. Birch, yellow poplar, beech, chestnut, cypress, gum, and many more meet a large demand. Each possesses qualities which give it value.

Maple is very hard, takes a smooth finish, has no figure except the birdseye of an occasional tree. It is among the whitest of our woods. Its strength rates very high, and its stiffness is excelled by few woods of this country. Eight species of maple occur in the United States, and probably every one is made into flooring except the vine maple, which is too small; but only one of the maples is prominent as flooring material. It is the hard maple of commerce. The silver maple (often called soft maple) is probably second among the maples as wood for floors.

Most of the fifty-odd oaks in the United States might be made into flooring and many of them are so utilized; but most oak flooring is of white oak, of which there are several important species. Oak falls below maple in hardness, stiffness, and strength; but it ranks high in these three qualities, and in addition, it is always more or less figured, and many persons use it because of the figure, particularly when quarter sawed. The red oaks are good stuff, but their color is not quite so satisfactory as that of white oaks.

Birch flooring is in a class with sugar maple in hardness, stiffness, and strength, and two species, yellow and sweet birch, supply most that goes to market. Beech floors have never been quite so popular as maple and birch, but beech is an excellent wood, very hard, stiff, and strong, and its tendency to wear smooth makes it popular for dancing floors. In damp situations it stands more wear than other woods, and this makes it desirable for factory floors.

The leading pine flooring is manufactured from southern long-leaf pine, which is hard, strong, and it is often figured by growth rings. Douglas fir, from the region west of the Rocky Mountains, is now much used for flooring, and it measures about with long-leaf pine.

Red, black, and cotton gums are employed in warehouses and factory floors where heavy planks are used. These woods are tough and last well under truck wheels and in other situations where rough usage is met.

Block floors are of pine, fir, and redwood principally, but many other woods contribute.

Perhaps six billion feet of wood are yearly worked into floors of various kinds in this country. This total is based on estimates and does not represent exact figures; nor does the total include the sills, joists, and other supporting and supplementary timbers which sustain the floors. The relative amounts of hardwoods and softwoods are difficult to estimate; but probably softwoods are more than half, the leading softwoods being yellow pine, fir, and hemlock, and the principal hardwoods oak, maple, beech, and birch.

EROSION IN THE APPALACHIAN AND PIEDMONT REGIONS

BY R. O. E. DAVIS

THROUGHOUT the South Atlantic States the excessive erosion of the soil is probably more marked than in any other section of the country. The results of this excessive erosion are worst in the Piedmont section of the coast states. There are many factors influencing the rate of erosion, but the character of the soil causes a marked difference in the rates of erosion under the same conditions.

The heavy clay soil of the region erode fairly rapidly developing the shoestring type of gully with rounded edges. Where soils somewhat lighter with a higher percentage of sand particles in them are encountered, the type of erosion is that of the gully with vertical sides, or the caving gully type. Differences in the soil and subsoil influence profoundly the character of erosion. Silty soils or clayey soils with subsoils of a sandy character exhibit the most rapid and most difficult controlled erosions.

CLEAR AND STRIKING EVIDENCE OF WHAT EROSION WILL DO

A gully in the lowlands has gradually eaten its way back into the hill of this Georgia pine forest. Each rain adds to the length and breadth of the gulch.

The regions of the South subject to excessive erosion are in a number of soil provinces, but the greatest amount of eroded soil occurs within the Appalachian and Piedmont regions. It is in the Piedmont Plateau, near the "Fall line," that the greatest difficulty is experienced in dealing with erosion. The Fall line forms the boundary between the Appalachian and Piedmont provinces and it is here that the rapids occur in the various streams in their course from the mountains to sea.

The soils of the entire section are mainly residual, *i. e.*, derived from the underlying rock and in general the topography of the region conforms to the structural character of the underlying layers. While erosion has affected the relation between the surface form and rock configuration locally, especially in the southern portion of the region, the main ridges correspond with the position and the prevailing northeast and southwest direction of the more resistant rocks.

In localities where the surface is smooth the soils lie directly over the rock from which they are derived, but on slopes a considerable movement to lower levels has taken place mainly through the action of water. Outcrop of rock is frequent, but by far the larger part of the area is covered with a soil mantle of sufficient depth for the support of forests. Much of it is so steep that it is not suitable for cultivation, and is best adapted to forests, grazing or small fruit production. The principal soils are the loams, clay loams, silt loams, sandy loams, clays, fine sandy loams and stony loams.

In the southern Appalachian region the forests on the hill and mountain sides have maintained an open and porous soil; kept in this condition by the covering of leaves and debris of the forest. The rains falling on the forest floor never reach the soil with unbroken force, so that the finer soil particles are not pounded and stirred and carried off in the water which flows over the surface. The velocity of the moving water is so reduced that where the forest covering is intact erosion is almost a negligible quantity. Where this rate of erosion is slow there has been established gradually a state of equilibrium between the slopes and rainfall. This slope remains practically constant for very long periods if the conditions are not changed. There is a slow movement of material, but this is not sufficient to disturb the general contour or to injure the vegetal covering. Only occasional cloud-bursts or exceedingly heavy rains produce a visible effect on the soil surface conditions.

THE SACRIFICE OF THE TREES

A small wash too long neglected in a soil especially susceptible to erosion has resulted in a gulch which even the fine forest of Georgia pine cannot stop. With every storm some mighty tree becomes a sacrifice to the appetite of this voracious monster.

It is true throughout the Appalachian region that the streams which flow from the wooded mountains carry very little sediment. Even the cases in which such streams appear turbid, much of the suspended matter is of organic origin. It is also characteristic of such streams that they rise more slowly after a storm, remain in flood for a longer period of time, and fall more slowly than similar streams in non-wooded areas. The Geological Survey has pointed out the characteristics of such streams in the Appalachian region of North Carolina and Tennessee. Cane River from Mount Mitchel and streams in the Lake Toxaway section never become muddy, although often greatly swollen from continued rains. These streams are in equilibrium with the land through which they flow. This equilibrium will be disturbed only by clearing the land, which causes a change in the relation of surface slope to stream gradient.

It is not uncommon to find the contrast to this condition in localities where the forest has been depleted either partly or completely by lumbermen. Often in the snagging of logs the trenches formed furnish drains down which the accumulated water rushes with great velocity. It is the work of a very short time to cut these trenches into gullies which often devastate great areas. Frequently in the Piedmont region the erosion begins near the lowlands and, in certain types of soil, gullies are developed that extend for great distances even into the forests.

In some sections of the Appalachian region where the forest has been removed from the mountains or steeper hillsides, denudation has taken place until good sized areas of the underlying, bare rock are exposed. Much of the mountainous land is too steep for cultivation. The removal of the forest is due mainly to lumbering operations. It is this type of activity that is most destructive. The trees are cut without much regard to size or position and as soon as the lumber has been obtained the lumbermen move on to fresh fields, with ruthless disregard to the later effects on the land recently divested of its forest covering.

In the Piedmont section the more devastating effects from erosion occur because this land is not too steep for cultivation and there has been extensive clearing of the land. The soils are of the same origin and very similar to the soils of the Appalachian region proper, so that from the results apparent in one region can be determined largely what will be the outcome of extensive clearing in the other.

The type of soil has a great influence on the rapidity with which bad effects from erosion become

THE GULCH APPROACHES—THREATENING DESTRUCTION

The removal of the forest covering has resulted in the formation of a gulch which has already forced its way across the road and is threatening to swallow up this farmhouse.

evident. It is possible on some types of soil, most notably the heavier clays, to cultivate on rather steep hillsides without serious damage from erosion. But even here continual vigilance is necessary to avoid the ultimate ruin of the land. On soils of a lighter character, or loamy condition, erosion is very destructive if once the land becomes gullied. On the other hand, soil of an open, porous nature is easily dealt with if the proper precautions are maintained to stop any indication of surface washing.

The fact that stream flow is greatly influenced by the presence of forests is so well known that it is almost trite to refer to it. However, when we consider the enormous damages each year from floods, as well as the cost of continual dredging of streams to maintain open channels for navigation, it becomes imperative that the forests' influence be emphasized. As already pointed out, many of the Appalachian streams rising in the mountain

THE DEVASTATING RESULT OF EROSION

A one-time fertile valley in Tennessee ruined by a covering of sand brought down from the nearby hills, deprived of thin forests and subjected to erosion.

forests are clear and free from sediment; but many, and they are fed invariably from watersheds, in part, at least, cleared of their forests, carry a heavy burden of sediment.

The Flood Commission of Pittsburgh appointed to investigate the cause of floods at Pittsburgh and to recommend means of removing the danger, reported that extensive deforestation of the drainage areas of the Allegheny and Monongahela Rivers by giving a higher rate of run-off, has been the cause, in part, of the increase in frequency and height of floods along these and the Ohio rivers. It is furthermore well known that the carrying capacity of the river channels at Pittsburgh has been considerably reduced in the last fifty years. The records show that floods are increasing in frequency and height. The evidence collected in this region shows that the Kiskimmitas and Youghiogheny rivers are the most important rivers in producing floods at Pittsburgh. The two streams drain extensively deforested areas of about the same size, with heavy precipitation and a high rate of run-off. In consequence of this deforestation both rivers collect and move their floodwaters to Pittsburgh in about the same time. This is but one of the worst instances where removal of the forest covering results in disaster to the low lying country.

Much of the erosion in forest is started by careless handling of logs. Under conditions where excessive erosion would not take place if care were exercised in handling cut timbers, the "snaking" and dragging of logs result in the formation of smooth depressions into which water gathers and drains from the steep hills. The rapid cutting of these depressions quickly results in the formation of gullies which advance into sections otherwise not susceptible to erosion.

The peculiar climatic and soil conditions of the Southern Appalachian region, especially, are conducive to the development of gullies. In some localities erosion started in the manner described continues to work its way back into the hills, constantly increasing in depth and width the eroded section with numerous gullies starting from the sides, until immense areas are devastated and the gullies formed almost defy the ingenuity of man to check their progress.

The removal of vegetable covering from the hills has resulted in a largely increased burden of solid material

in the rivers. This sediment is carried to the lower lying regions and much of it is deposited in the stream beds. The river channels become so filled that navigation is greatly hindered, or constant dredging must be resorted to. In addition, where storage reservoirs have been built by constructing dams, the sediment is deposited in the reservoirs and reduces their capacities. In fact, in some places it has been found inadvisable to try to maintain storage reservoirs, and the practice has been adopted simply of keeping open a channel. This results, of course, in the loss of much power. One of the power experts employed in developing the power from some of the streams in the South, testified before the Agricultural Committee of the House of Representatives a few years ago that the capacity of certain reservoirs was so much reduced that in a few years only the flow of the rivers would be available for power. A report from the Geological Survey on the amount of silt carried by some of these rivers, states that the Susquehanna carries to the sea, annually, 240,000 tons, the Roanoke, 3,000,000 tons, the Alabama, 3,039,000 tons, the Savannah, 1,000,000 and the Tennessee, 11,000,00 tons. It is but reasonable to assume that at least half of this wastage of soil material is preventable.

In discussing reclamation it is well to remark that it is infinitely better to practice prevention than to apply reclamation. However, there is no denying the fact that the damage has been wrought in many places, and methods of reclaiming the devastated areas must be considered. In the past, with cheap land, it has been easier and less expensive to move to new lands, when those being farmed began to erode. But with increased value of lands the necessity of utilizing that already cleared becomes constantly more and more impelling.

Reclamation is of two classes; lands reclaimed for cultivation and those for forests. The same methods that are used in prevention must be used in reclamation. Where lands are reclaimed for purposes of cultivation, methods are adopted to increase the porosity of the soil, thereby assuring the ready absorption of water, and to retard the velocity of water not absorbed and flowing over the surface of the soil. The incorporation of organic matters in the soil, the growth of deep rooted crops, green manuring, sodding to pasture, deep plowing, the use of various forms of terraces and hillside ditches are some of the more common methods employed to prevent erosion and to reclaim eroded soils.

LAND RUINED FOR AGRICULTURE BY GULLYING

A deforested area near the Tennessee-Mississippi line which has resulted in the formation of numerous gullies and has ruined the land for agricultural purposes.

The forests have been removed from some soils that should never have been deprived of their natural growth. In such sections the devastation has been almost unbelievable and the only feasible method of utilizing in any way these lands is by reforesting. The type and kind of trees best suited for the work must be determined for the individual localities.

From inquiry and personal inspection of the worst eroded sections of the Appalachian region, it has been found that practically all of the lands now useless can be utilized by reforesting. The benefits of such a course can hardly be exaggerated. The losses entailed in manufactures, power development, navigation, and flood conditions now amounting to millions yearly, will be greatly reduced if not largely eliminated.

WHY AND HOW SOME FOREST FIRES OCCUR

THE tremendous forest fires which swept the forests of the northwest during July and August, costing millions of dollars to fight and causing damages amounting to many millions of dollars more were due to what?

This interesting question is well answered in a letter dated August 2, to AMERICAN FORESTRY, by R. H. Rutledge, acting district forester of District No. 1, which includes the national forest area of northern Idaho and Montana. The fires were due to a dry year, the third in succession. Lightning, railroads, campers and brush burning started most of the 909 discovered on this forest area in July. Almost one-fourth were due to unknown causes, and twenty-seven were incendiary.

A terrific thunderstorm on July 31 resulted in fifty fires being started by lightning.

"This is the third dry year in succession for District 1," says Forester Rutledge. "The snowfall last winter was far below normal and in many localities spring precipitation was insufficient, many places having been without rain for over three months. High winds have prevailed quite generally for some sixty days and the atmosphere has been charged with electricity to such an extent that dry electrical storms have been constantly occurring. As a result the forest floor is as dry as a powder-house and because of excessive transpiration the leaves of coniferous trees have become so combustible as to be almost explosive when subject to ignition.

"While human agencies have been responsible for some of the fires this season, lightning has been by far the most prolific source of trouble. Dry electrical storms have started a great many fires in the most inaccessible parts of the forests where it has been impossible to get men and equipment on the ground quickly. In numerous

TWO UNUSUAL FIRE PICTURES SHOWING TREE STRUCK BY LIGHTNING AND ITS SPEEDY DESTRUCTION.

Live yellow pine tree, 125 feet high in the Selway National forest, struck by lightning about 2.30 in the afternoon. Bolt struck at point indicated, followed down tree to a large limb on right hand side of tree at upper edge of flame showing in picture. At that point it entered body of tree, followed down inside, splitting it through and through but did not break it off. 15 or 16 feet below bolt emerged, and continued down on outside of tree to ground in 3 distinct paths. Smoke was seen coming out of the split portion of tree shortly after bolt struck.

The second picture shows the split portion of the tree more throughly burned, and at one point will be observed a hole burned through the tree. The tree fell, completely destroyed by fire, twenty-four hours after it was struck. There now remains only a blackened fire scarred trunk 20 feet high. Picture presented by Supervisor Fenn, of the Selway National Forest, Montana.

cases it has required from three to six days for fire fighters to reach a fire from the nearest railway point. And when it is remembered that equipment and supplies for the men must be transported on pack horses over rough mountain trails and kept on the line at all times, the difficulties of the situation will be appreciated. Under these conditions it can be understood readily how lightning-set fires in these remote places become raging conflagrations before the fight against them can be begun.

"In spite of the difficulties handicapping the fire organization, District 1 has made a remarkable record for efficiency, even though a very large acreage in the aggregate has been burned over and many bad fires are still burning.

"Commonly fires due to preventable causes are near lines of transportation and communication and can be discovered and suppressed before they assume serious proportions, but the reverse is true where lightning fires occur. Not infrequently in the most inaccessible mountainous regions ten, fifteen, or twenty fires are started within a few minutes by a single electrical disturbance. Sometimes these blazes are scattered over quite a large extent of territory, often they are close together and before it is possible to start the fight against them they coalesce and form one big fire which, if the wind is blowing freshly, soon reaches the tops of the trees and develops into a crown fire that defies human efforts to combat it so long as the wind continues."

The area of fires was as follows: One-quarter acre or less, 427; one-quarter to 10 acres, 295; over 10 acres, 187, a total of 909, while the total acreage burned was 201,014 acres.

The causes of fires were as follows: Railroads, 179; campers, 131; brush burning, 96; lumbering, 9; lightning, 240; incendiary, 27; miscellaneous, 8; unknown, 219.

"The great majority of these fires have been put out or are now definitely under control and no longer dangerous although still being watched. At the close of July 30, there were not more than 25 fires running uncontrolled, mostly in the mountains of Idaho. On that date approximately 3,500 fire fighters were on the line, this, of course, not including the force of rangers, guards, lookout men, smoke chasers, and other regularly employed forest officers, numbering about 1,500 men.

"Detailed reports on file from the several national forests of the district cover the situation only up to the close of July 30. During the night of July 31, over fifty fires were started by one severe electrical storm that ran along the westerly slopes of the Bitter Root Mountains in Idaho forests. These fires have been merely reported by wire, their extent or precise locations not yet having been determined by the field officers. They were scattered over a territory embracing roughly 4,000 square miles. Does this single night's experience convey an idea of what the Forest Service fire organization in District 1 is contending with?"

F. C. Wilfong and his crew met with a most trying experience during the Selway fire on Crooked Creek on July 24. They were trapped at a point where three fires met, and their camp with provisions, clothes, etc., was burned. The party saved themselves only by lying in the Selway River for 35 minutes with wet blankets over their heads. Their train of thirteen pack horses was caught in the track of the fire, but they had been taken to a bunch grass hill, and only one horse was lost. The pack saddles were burned from the backs of the other horses.

Mr. Wilfong says of his experience: "There was no way out of it, we were cornered and we plunged into the water, keeping our faces above the surface. We put wet blankets over our heads for the heat was so intense that our flesh would have been burned if we had not taken that precaution. The roar of the flames was tremendous but we were comparatively safe.

"Once I raised the blanket a little to peek and see how the fire was going and what do you think I saw? There was a big bear perched on a rock right at my feet and looking over at me like he was ready to jump. I guess he thought I was a rock. We exchanged glances for a while and I am willing to bet that he wasn't any more scared than I was, but as soon as he recovered from the surprise, he turned tail and away he went. It was the last I saw of him."

CONSERVATION OF PAPER

ECONOMY in the use of paper will release vast quantities of chemicals which are urgently needed.

A pound of paper wasted means from 1 to 3 pounds of coal wasted.

Cutting down the use of paper 25 per cent would mean 6,000,000 tons less freight for the railroads to haul and would at the same time save 2,500,000 tons of coal.

Old magazines, books, stationery, etc., are used in making books, writing, and other forms of paper.

Paper that comes around purchases at the store is made over again into new paper, cardboard, cartons, paper boxes, paper bags, etc.

One hundred pounds of soft white paper shavings will make 90 pounds of new paper.

One hundred pounds of old magazine paper will make 80 pounds of new paper.

One and one-half million tons of book and writing paper were made last year from old paper.

One hundred pounds of old folded newspapers will make 85 pounds of new paper box board.

Two and one-half million tons of various kinds of paper box board were made last year from old papers.

One hundred pounds of old cotton rags will make from 65 to 75 pounds of paper pulp; this pulp will make only 2 per cent less than an equal amount of paper.

One hundred pounds of new cotton rags will make 80 pounds of paper pulp.

One hundred pounds of old collars, cuffs, pillowcases, or sheets will make 80 pounds of new paper.

Woolen rags are converted into shoddy and shoddy converted into wool. The shrinkage from shoddy to wool is the same as from raw wool to finished wool, namely, about 3 per cent.

One hundred pounds of wool saved or reclaimed provides sufficient material for 25 suits of clothes.

TREE PLANTING TAKEN UP BY MANY EDITORS

NEWSPAPERS OPEN COLUMNS TO DISCUSSION OF LIVING MEMORIALS AND "ROADS OF REMEMBRANCE" IDEA

READERS of the New York *Times* find the columns of that paper have been opened to a discussion of the merits of roadside tree planting. The New York *Times* had a fine editorial on the American Forestry Association's campaign for "Roads of Remembrance" in which it said: "The American Forestry Association is doing good service in linking the causes of roads and forestation. The Road of Remembrance and the shaded highway have a more intimate connection with the general problem of reforestation than may at first appear. Very soon they will become bases for the advance of veritable armies of trees. Nature unaided may be sure, but she is slow. The industrious squirrel carries acorns, hickorynuts, walnuts and chestnuts a rod or so before he buries them—and fortunately often forgets his cache. The winds carry the seeds of maple, pine, and linden a little further. But for reasons at which the forester can only guess there are vast prairies and waste lands without a useful tree. The shaded highway will cross them and the shade trees will scatter their seeds and nuts in the nearby country.

"He who plants a tree is building the world of the future. In twenty years a maple will grow to a sturdy tree, with dense if not widespread shade. And in that time, when wind and soil are favorable, it is already parent to groves of young maples marching from the highway across lands that have hitherto been waste."

This brought out many letters from readers who advocated fruit and nut tree planting. The *Times* has devoted several editorials since the first one answering some of the letters and sticking mainly to the planting of shade trees. The first letter printed was from Alida (Countess) von Krockow who pictured the roadside fruit trees of Europe. George J. Horowitz, formerly of the Ambulance Service with the French Army, wrote about the virtues of the French roads. Dr. Robert T. Morris contributed a letter, as did Henry Woodward Hulbert on the planting of trees. The *Times* gives the members of the American Forestry Association a first hand lesson on what can be done if the members will take up these subjects with their newspapers. The editors are keen for just such discussions and while they may not always agree with the writer they are glad to give space to constructive thought. Every member of the association should discuss the need of a national forest policy with the editor of his paper and tell him what the American Forestry Association is doing.

Forty Maples.

A Yankee farmer fourscore years ago
Set forty maples by the highwayside;
Twenty tall saplings stood in either row;
The farmer viewed them with a silent pride.

They grew apace; there children schoolward bound
Loitered in spring to pick the bloodroot flowers;
There many a bird found sanctuary ground,
And laborers refuge from the sudden showers.

They waxed in size and beauty when the beams
Of our mid-summer sun's unpitying beat;
Here dusty drivers paused to rest their teams,
And cattle sought a shelter from the heat.

They statelier spread; when autumn's pageant came,
And all our valley donned its festal dress,
Rose forty pillars lit with crimson flame,
To stir man's spirit by their loveliness.

But years passed, and the farm fell to a hind—
A prosperous, pushing hind from overseas,
Who, with the full contempt that marks his kind,
Felled in his blasphemy those forty trees.

At times like that one's peaceful spirit longs
For the fierce justice of an elder day,
For the stern sense that trifled not with wrongs,
And did not deem that punishment is play.

Who, save for need, destroys a goodly tree,
Does mischief; and who wantonly may kill
Forty such trees does murder, and should be
Hanged forty fathom high on Gallows Hill.

—G. S. B. in the New York Tribune.

In the *Review of Reviews*, Elbert Francis Baldwin details the devastation in France and Belgium and tells of the plans of the American Forestry Association for helping in the restoration of these forests. Dr. Frank Crane, who writes for a syndicate of newspapers, has devoted another editorial to forestry, this time to the "Roads of Remembrance" idea and also urges co-operation with the Association in its work abroad. This editorial appears in such papers as the Chicago Daily *News*, the New York *Globe*, the Washington *Star*, Philadelphia *Bulletin*, Atlanta *Journal*, Kansas City *Star*, Cincinnati *Times-Star*, Buffalo *News*, Pittsburgh *Chronicle-Telegraph*, St. Louis *Star*, St. Paul *Dispatch*, Des Moines *Capital*, Milwaukee *Journal*, Sacramento *Bee*, Dallas *Times-Herald*, Omaha *World-Herald*, Binghamton *Press*, Houston *Post*, Richmond *News Leader*, Oakland *Post*, Boise *Statesman*, Baltimore *Star* and many others. Here is where the members should co-operate with the Association by writing an appreciation to the editor of the paper in which such features are used. *Leslie's Weekly* has a generous editorial on the value of tree planting and the New York *Herald* takes up the question of better fire protection for forests by saying "with summer fires of unusual severity sweeping the extensive timber lands of Montana, Idaho and Washington, the American Forestry Association is urging the lumbermen to forward their views as to the steps to be taken for the better protection of the woods." The *Herald* then goes on to point to the losses.

The Trenton *Times-Advertiser* devotes a long editorial to roadside tree planting and points to the fact that "if this work is properly carried out it would mean in time a memorial highway across the United States. No finer memorial can be built than a tree bordered highway and aside from tender sentiment connected with such an undertaking there can be no better investment for any community." The Denver *News* calls attention to the fact that the "president of the American Forestry Association has issued a call to the people to beautify their highways as memorials to the men who fought for world freedom. Good roads and tree planting go hand in hand. Federal and local authorities are attending to the road building but it will require voluntary citizen effort to get trees planted." The Washington *Times* points to the famous Potomac Drive made famous by its trees and adds "here is a logical proposition. The roads are to be built. A

road is more than a way to get some place."

The subject of permanent Christmas trees that has been urged by the Association is taken up by the Milwaukee *Journal* under the heading "Waste of Good Timber," the Hoboken *Observer* and the South Bend *News*. The Milwaukee *Journal* says on this point:

"Trees adapted to Christmas use have survived the ills and perils of infant life. Barring accidents, they are sure to live grow, and flourish. It is savagery, if one views it rightly, to destroy them. Yet men who would not harm a full-grown tree hack down treelings without pity or remorse. But if we are to have trees for all time, young trees must be saved."

"The idea of planting trees as memorials for our soldier boys who will not return is a beautiful one," says the *Ohio Farmer* as we find it quoted in the Fredericktown, Ohio, *Press*. "The Christian Endeavor Societies have been making a concerted movement toward planting memorial trees at the original suggestion of the American Forestry Association" the *Times Journal* of Bowling Green, Kentucky, points out. The Kansas City *Star* wants to know "why a billion dollar town is content to look like thirty cents?" And points to the city's shabbiness in the way of vacant lots. Prompt action is urged by the Hamilton *News* or we will find "this country will have committed economic suicide," says that paper in urging a national forest policy and fire protection for our forests. The *Journal* of Portland, Oregon, reprints the editorial from the New York *Times* on the work of the Association with a letter from I. N. Lipman, an enthusiastic Oregonian, who points out the advertising Oregon is getting because of its good roads. "Replenish the forests," says the New Orleans *Item*, and points to what Kansas and Illinois, known as prairie states, are doing in foresting the land. "It is a melancholy fact," says the *Item*, "that few persons are willing to take steps in time to keep a natural resource from becoming exhausted."

The Burlington, New Jersey, *Enterprise* has had two editorials on forestry and reprints the editorial from the New York *Times* in full, with a two-column head and the Western Newspaper Union has sent out a special feature on "Roads of Remembrance" illustrated with several pictures. "Grit" uses a half-page feature on memorial tree planting and the International Syndicate of Baltimore has used half-page articles on forestry in general and memorial tree planting several times. The news services, the Associated Press, the United Press, the International News Service and the Universal Service are all using news stories of activities in forestry. The *Christian Science Monitor* used a half column on the need of a national forest policy, and followed it with an editorial on the "World Call for Wood," which concludes that the "need of the hour is to overcome the inertia that has always operated to keep the adequate handling of the forest situation in this country behind the actual requirements." In opening the editorial the *Monitor* points out that "what the people of the United States could accomplish if every person having an interest in land would intelligently and persistently raise the trees which his land could conveniently allow space for, has never been measured, unless, negatively, through the obvious waste of tree opportunities every where." It would seem the editor had every member of the Association in mind when he wrote that sentence and a more urgent call for co-operation could scarcely be phrased.

In Montreal the *Daily Star* deplores the fact that trees are fast disappearing from the streets of that city and calls for action. In the Atlanta *Constitution* we find continued co-operation with the Association in an editorial on the terrors of a forest fire. The San Diego *Sun* urges that a tree be planted every time one is cut down and the Concord *Monitor* says, "had the forest policy of this country been what it should have been we would have timber for ourselves and for Europe and to spare." The Houston *Post* is of the opinion that "what the country needs is a strong movement to induce the planting of trees similar to the movements that have resulted in such increased production of food for war purposes." The San Francisco *Chronicle* takes up the "Hero Grove" in Golden Gate Park at length. The Boise *Capital News*, in an editorial on the planting of memorial trees by the war mothers, says: "Though the final dedication may be a great public affair, there is something singularly appropriate in this private planting of trees by the people who, when all is said and done, care more than anybody else."

The *Manufacturers' Record* of Baltimore seldom has an issue in which the subject of forestry is omitted. The Chicago *Tribune* has taken up the question of the Forest Preserve near Chicago and calls upon the people to help preserve it by keeping their hands off the beautiful things in the preserve. To quote the *Tribune*: "Why worry about the extinction of the bison and elk and not care a continental whether the things which are native hereabouts live or die?" The lack of shade trees along Harrisburg's streets is the subject of a stirring editorial in the *Evening News* of that city. The Bethlehem *Times* is devoting as much as a column a day to features from the American Forestry Association. The Worcester *Post* is urging the planting of memorial trees in that city and has asked the Association for all data on the subject of tree planting. To print a list of the newspapers using news from the Association would be to print the directory of such publications. The greatest of opportunities for members of the Association is at hand. Their co-operation will bring forestry to the front in each locality. Now is the time to act by writing to your editor and sending to the Association anything you see dealing with the forestry problem.

FAMOUS ELM SAVED IN HUNTINGTON, INDIANA.

The famous Elm Tree at Huntington, Indiana, has been saved by the entire change of architect's plans for a church which is to be erected by the Christian Science Congregation of that city. In a report to the American Forestry Association Daniel Shaeff, who led the movement to save the tree, announces that the architect, Samuel A. Craig, will so redraw his plans that the tree will be left with plenty of root space, and that he will leave out the organist's room and the Sunday School classroom in order that the branches may have plenty of space. This movement, in which the congregation is glad to join, is perhaps one of the most unique ever adopted in order to save a tree. The picture of this tree appears on another page of the magazine.

TO SAVE CALIFORNIA REDWOODS FOR AUTO ROADS.

A movement has been started to save the California redwoods along the roads. "The plan is for the purchase by the State of a strip on either side of state roads in the redwood country, along which the giant trees shall be left untouched," says the San Francisco Chronicle, "as a memorial of the great groves of the past and a keen delight to the traveler through that region." Edward E. Ayer, of Chicago, who motors through the region every year, has reported to M. H. de Young of San Francisco that in some sections "a battlefield could not look worse than where the lumbermen have been cutting down these giants of the forest."

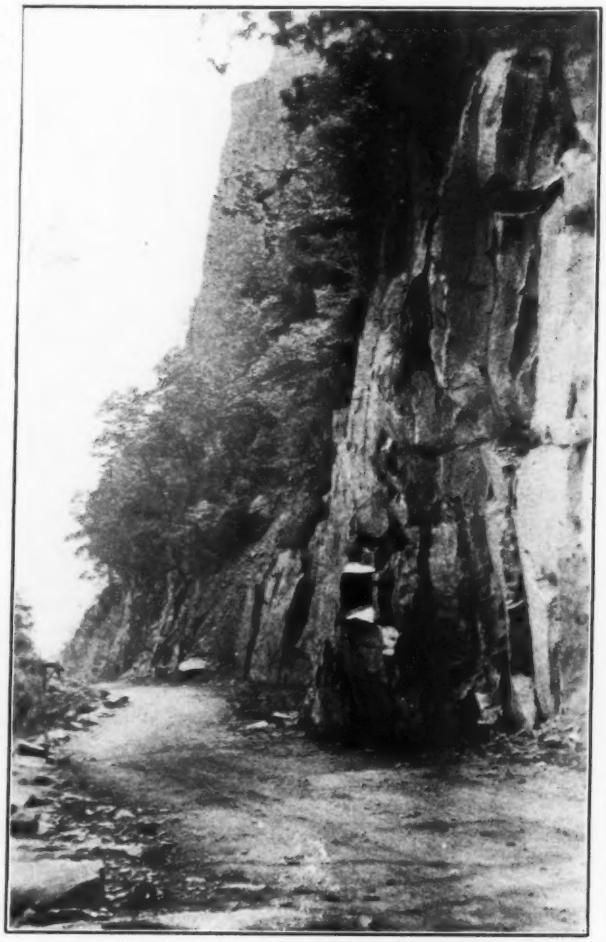
SUMMER WALKS IN THE WOODLAND

ALONG THE PALISADES IN THE INTERSTATE PARK

BY J. OTIS SWIFT, AUTHOR OF WOODLAND MAGIC

(PHOTOGRAPHS BY THE AUTHOR)

THERE is an order of holy men who go about the world doing good to inanimate things. You will know them by the far-away, detached look in their deep eyes when you meet them in the crowded streets, and by the way they have of looking away over the roof-tops as if used to great spaces and lofty mountains. You will come upon them in the waste places, in the shade of the deep woods, on the margin of the brook, the pitcher plant-haunted, quaking peat of the bog, and walking lonely hill paths in the cool of the evening. Then you will discover that the far-away look in their eyes has gone. In its place is quick flashing attention to every drooping leaf, bent twig, lichened ledge, rabbit path and flitting thrush. These men are priests of the Order of Nature. Sometimes they are old and bent, with palms calloused by the plough handles and the pruning hook. Again they are youths with soft treading feet and poet's mouths. But all are holy, for they have received their initiation as children in the secret places of the deep forests and their lives, among other things, are consecrated to loving, appreciating and caring for inanimate trees, shrubs, plants and mosses that animate nature—insects, birds, animals and men, may be happier. This is the ancient order to which Pliny, Linneas, Asa Gray, Donald Mitchell and Thoreau belonged, and to which you and I are initiates. Its members are the sort of men of whom women, children, dogs and wild creatures are never afraid and are usually trustful and fond. There is a secret bond of fellowship between them and every living thing in the wilderness and waste places. So come, this September morning, and we will make a pilgrimage from Hastings-on-Hudson, across the river to the great Palisades Interstate Park, the most weirdly beautiful spot about the American metropolis.



ONE OF THE NEW AUTOMOBILE ROADS WINDING ROUND THE MAJESTIC CLIFFS OF THE PALISADES.

This park is being developed by the Palisades Interstate Park Commission representing both States of New York and New Jersey, with jurisdiction along the west bank of the Hudson from Fort Lee, New Jersey, to Newburg, New York. The Commission has acquired all of the Palisades section extending up to the tops of the cliffs from Fort Lee to the State line opposite Hastings, and it is a little out of this wonderland we will visit today, for we cannot hope to explore the summer camp for the military training of youths south of Nyack, rugged Hook mountain at the top of the Tappan Zee, the big Bear Mountain tract a few miles south of West Point, or the Harriman Park section of 30,000 acres running west from the Hudson towards Tuxedo, all in one day. This great park, as wild and romantic in places as a bit out of the heart of the Rockies, has been made possible through money and land appropriated by New York and New Jersey, through the gift of 10,000 acres of land and $1,000,000 by Mrs. Mary W. Harriman, and gifts by other individuals of various parcels of land, an aggregate of nearly $2,000,000. It all lies at the doorway of New York City so that a scrub-woman may spend her day-off in forest depths under the shadows of the frowning palisades for a few pennies and a few minutes' time in getting there on the ferry.

We go down to the wide blue river at Hastings, and row over to the shadow of the cliffs, dropping down with the tide to Alpine, opposite Yonkers. We are seeking solitude, and find it in spite of the fact that thousands of people landed here at Alpine last Sunday and were

swallowed up by the precipitous paths, jungles and hillside forests in a few minutes. We have certain things to say to Mother Nature, and must sit in front of stone altars in inner recesses of the vast rock-heaps at the foot of the purple crags, jumbles of broken trap from the size of a man's head to a house, hurled down by frosts of untold ages, and make our confession. We must ponder upon the persistence of this thing we call Life and which is all around us from the crawling partridge berry vine, woodbine and honeysuckle, binding the rocks together, to the earth currents palpitating in the solid ledges and rising with the sap in giant old oaks, tulips, black birches, and sycamores, towering above. Leaving the little white house that was Cornwallis' headquarters in the Revolution, and nestles now at one of the nine docks for steamers at the foot of the Palisades, we plunge up a tiny hidden foot path toward the bottom of the crags. A scarlet tanager flutters along ahead to lead us away from her nest, discovered at the end of a black birch's limb. A chipmunk sits on a mossy log and stares, and a gray squirrel scolds from a black oak. At once we are as far from civilization as if we were lost in the Adirondacks. From the shore of the river the fallen rock debris rises at an angle of forty-five degrees or so, several hundred feet in places. Ages of erosion that started, perhaps, with the deluge, leaf-mould from centuries of vegetation, earth deposited when the Hudson was an unthinkably big stream, draining the Laurentian hinterland, cover stretches of the rock heap. In this grow all—I am sure—of the trees and shrubs indigenous to the locality. Then, rising majestically in sheer wall, fissured battlement, detached pinnacles and weather-scarred, time-colored precipices, to a height of between 300 and 500 feet, begin the Palisades. They are of a lava rock called trap which was penetrated as a sheet into the Triassic sandstones. Next to Niagara Falls they form one of the most widely known natural phenomena in America, probably because of their nearness to one of the world's great cities. The awesomeness of their dizzy height as we look up, contrasted with the simple sweet beauty of beds of wild spikenard or False Solomon's Seal, tall meadow rue, bloodroot, wild ginger, white baneberry, black cohosh, wild bergamot, pipsissewa, and clumps of mountain laurel, pink azalea, bayberry, blueberry, black-cap raspberry and blackberry, growing all around, appals us. The beautiful twelve-mile fringe of sloping land under the Palisades is a paradise for artist, naturalist and geologist. Although the State Commission of Conservation, headed by George W. Perkins, has spent much money and done an incredible amount of work building bathing beaches, lawns, boat lagoons, winding paths, automobile roads, log comfort stations, bridges, piers, masonry walls, causeways, and monster rustic pavilions that would have decked a Roman emperor's gardens, the vast wilderness of the park remains untamed and is its greatest asset. "The Commission is doing its best to

THE ENTRANCE INTO ONE OF THE HUNDREDS OF BEAUTIFUL WOOD PATHS IN THE PARK.

AT THE FOOT OF THE CLIFFS STILL STANDS THE QUAINT LITTLE WHITE-WASHED HOUSE WHERE CORNWALLIS, IN LONG GONE DAYS, MADE HIS HEADQUARTERS.

preserve the great natural beauties and advantages which God in His wisdom conferred upon the land over which it has supervision." Here and there, lost in the tangles of sumac, wild cherry, black haw, alspice, sassafras and elderberry are deserted, tumbled-in cellars of colonial houses that were places of importance when the Red Coats were chased across the river by Washington's troopers, but now overgrown by woodbine and wild grapes. The pink and white roses of the colonial women, planted to celebrate the love of happy homes, have gone wild and bloom luxuriantly, running back to Nature. An hundred old fashioned herbs and flowers that in the course of almost three centuries have escaped from the gardens up over the cliff tops have dropped their seeds over the dizzy edge and taken root below. It is a bird, animal and tree sanctuary, we find as we leave the path two hundred feet up and turn along one of the new automobile roads the Commission is cutting under the lower edge of the cliffs. We climb up over the slides of broken trap to the top of the age-old crags at one of the places where ascent is possible and creeping tremblingly to the lip of the chasm look away south to the great city sweltering in its heat and noise, to the ships dotting the harbor and river, down to the dock half a thousand feet below us; to Yonkers across the stream, to Graystone once the home of Samuel Tilden, just above; to Hastings where Farragut lived; Dobbs Ferry where nestles on the hillside the home of the late Robert G. Ingersoll; Irvington, the home of Washington Irving, and Mystic Sleepy Hollow lost in the blue haze beyond Tarrytown. Five miles above us on the west side of the river, glancing along the Palisades, rises Indian Head, the highest shelf of the cliffs, the profile of the old savage, tossed there, it is said, from a blanket in the hands of Hendrick Hudson's sailormen, looking out of the crags in surprise at the changes since his descendants sold their heritage to the Dutch West India Company for a mess of pottage, or a blanket, or something.

ON THE LIP OF THE CHASM—FAINTLY VISIBLE IS THE OPPOSITE SHORE LINE AND A STEAMER WENDING ITS WAY UP THE BEAUTIFUL HUDSON.

THE PATH WINDING ROUND THE CLIFFS, FROM WHICH DELIGHTFUL GLIMPSES OF THE RIVER FAR BELOW MAY BE HAD.

It is all overpoweringly beautiful and inspiring, and we know we can never adequately describe it, but as we look there comes up from a treetop growing out of the rocks below us the clear sweet music of a song - sparrow saying, "tweet, tweet - flitter," which is nonsense, but heavenly music nevertheless, and far more indescribable than a marvelous landscape. Descending the crags to where in a deep cool nook, among broken rocks as big as hayracks, a spring pours out, cold and crystal, for our blessing. We drink, and lying on the mosses, staring up at the cliffs and blue sky beyond, feel our littleness. Here in the silence the spirit of the place comes to us like a quiet caress.

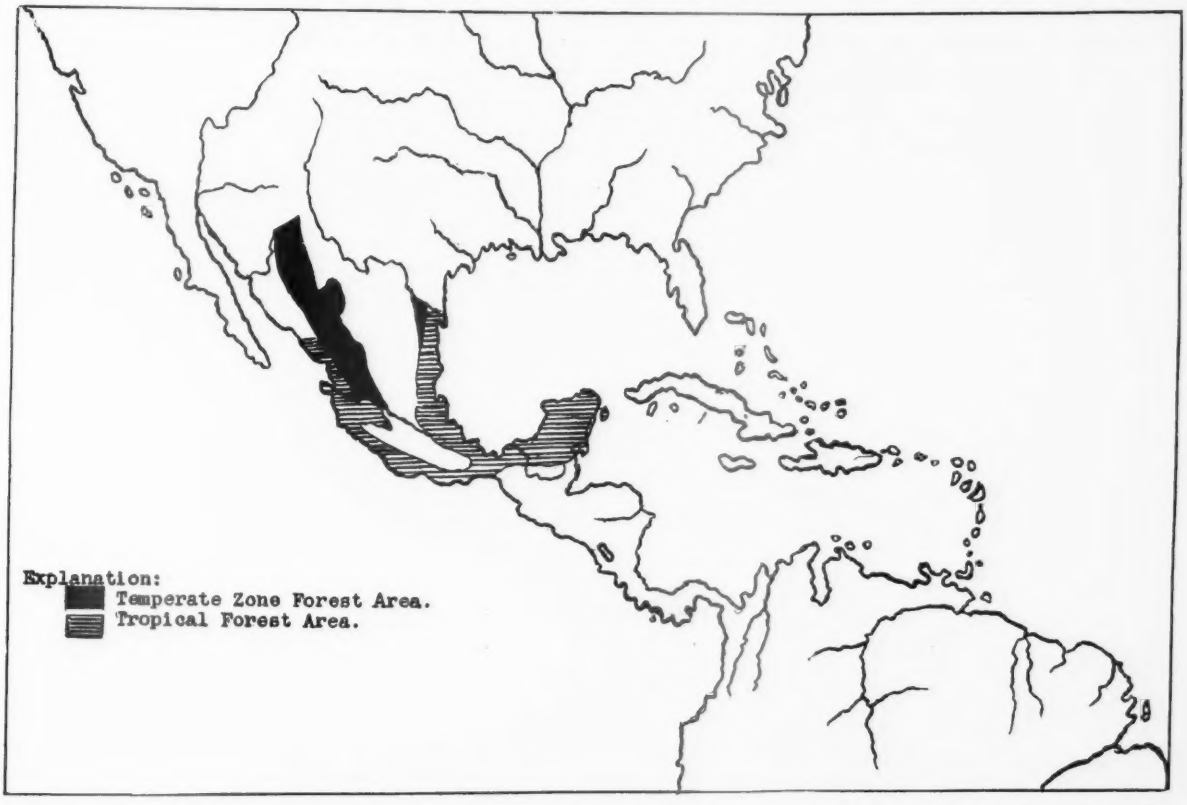
LOOKING DOWN ON THE DOCKS, HALF A THOUSAND FEET BELOW. THIS SPOT AT THE TOP OF THE PALISADES AFFORDS A MAGNIFICENT VIEW OF THE SURROUNDING COUNTRY.

As the sun sinks behind us we go down winding roadways and paths, among deep forests with occasional glimpses of the river below caught through openings in the dense mat of treetops where the thrushes' chant, to the landing—drifting home in our boat on the broad silver river in the moonlight.

MEXICO AS A SOURCE OF TIMBER

BY AUSTIN F. MACDONALD

A FEW years will often work startling transformations in the motives and desires of a people; and not the least wonderful is the change which was wrought in the lives of the American people by our participation in the great world conflict. In 1916 we were busily engaged in the absorbing task of making money, we were looking for profitable opportunities to invest that money. In 1918 our sole aim was to win the war, and foreign investments, no matter how alluring, did not appeal to us. But now America has emerged triumphant from the struggle, and the present time marks the dawning of a new era of prosperity. Once more American capital is seeking satisfactory opportunities for investment, and intelligent information on this subject is rapidly becoming an urgent need.



There is, perhaps, no bit of advice which the American business man has heard more frequently in the past than the suggestion to invest in Mexican timber. Just what kind of timber, and in just what part of Mexico, seems to have been entirely immaterial. Strangely enough, enthusiasm about this timber seems to have been in inverse ratio to the actual amount of knowledge concerning it. The purpose of this article is to state concisely the extent of Mexico's timber resources, and the location of these forested areas.

In the year 1913 the Republic of Mexico exported commercial timber valued at $3,365,131, and dye woods valued at $495,257. While these figures are not large when considered by themselves, relatively they are very important, for the forest products during the year 1913 formed approximately one-eighth of the total exports of the country. We must not conclude, however, that a comparatively small export of lumber means a lack of forests in Mexico. On the contrary, it merely signifies that the great forest areas have not yet been developed and are still awaiting exploitation. The Republic has been estimated to contain 479 square leagues of thick forests and 18,134 square leagues of wooded land. Its forests are rich in every variety of the precious woods, besides great areas of commercial timbers. Because of the lack of laborers and the difficulty of transportation, and because of the presence of precious metals, exploitation went on very slowly for over two centuries. Now, however, the people are beginning to realize the vast wealth of their forested areas and are developing them at a rapid rate. Wasteful methods of hauling and cutting which are at present being employed will if continued lead to deforestation. More scientific exploitation is needed, and it must come quickly.

One must not conclude from these introductory remarks that all Mexico is one vast forest. There are great stretches of waving grain and of the crops of a more tropical agriculture, and there are vast areas that are uninhabited deserts. For the purposes of this paper

the country may be conveniently divided into three districts. The first of these is the great tropical forest belt. This covers almost the entire peninsula of Yucatan, as well as the small states of the southeast which border on the Gulf of Campeche. Some tropical woods are also found along the Pacific littoral in the far southwest.

The second area is the Temperate Zone Forest Belt. This is located in the northwestern section of the Republic, extending northward almost to the American border. It begins from 100 to 150 miles west of the Pacific coast, and extends eastward over a large strip of territory. Between these two districts is the Treeless Belt, some of which is cultivated, but much of which is arid.

It is from the Tropical Forest Belt that logwood and the other dye woods come. Logwood is found in the southern part of the State of Yucatan, which is in the extreme north of the peninsula of that name along the Gulf of Campeche, and over the entire eastern section of the peninsula. Its exploitation has been neglected for several years. Since the demand for the product was revived, however, several ineffective attempts have been made to resurrect the industry in the Peninsula of Yucatan. These in many instances have not survived the effort to obtain sufficient labor. In the forests of Quintana Roo there are piles of cut logwood which are not available because laborers cannot be obtained to haul them. This difficulty, coupled with the inaccessibility of the product, makes exploitation very difficult, and to a large extent impracticable at the present market price. A lack of vessels is another difficulty which must be met when the product finally reaches the town of export. This logwood is used for dyeing materials and in the manufacture of ink. The largest exportation of the product at present is from the State of Tabasco, which borders on the Gulf of Campeche. This is practically the only export of the state. During two months in 1916, 4,371 tons were exported, valued at $327,127. All of it was shipped to the United States.

In the Tropical Forest Belt are also found mahogany, ebony and other precious woods. Along the Gulf of Campeche, particularly in the southwestern part of the Peninsula of Yucatan, are great forests of mahogany and Spanish cedar. These are chiefly in the hands of American and native companies, who export considerable quantities. From July, 1911, to June, 1912, mahogany and Spanish cedar, valued at $1,236,000, were shipped from the small town of Carmen alone. Large areas of the cedar are also found in the interior of the peninsula, but a lack of transportation facilities has made their exploitation almost impossible up to the present time. All along the eastern coast of the Republic, particularly in the southeast, although to a lesser extent further north as well, are found tracts of mahogany in paying quantities. The State of Nuevo Leon, which is situated in the extreme northeast some distance from the coast of the Gulf of Mexico, has the chief area of ebony, which is being exploited rapidly. To the east of Nuevo Leon, directly on the coast, are large forests of mahogany which have not yet been developed.

By far the largest part of the forest products already exported have come from the Tropical Forest Belt. The Temperate Zone Forest Belt has until very recently been practically undeveloped, and it is from this region that a great increase in the lumber industry may be expected. This area is a broad belt in the northwestern part of the Republic, with its western edge about 150 miles from the Pacific Ocean. The Sierras which traverse Mexico from north to south are well wooded on both their eastern and western slopes. Pine is the commercially important timber, the principal varieties of which, in the order of importance, are yellow short leaf, yellow long leaf and Weymouth. Some oaks, cedars (the kind generally known as cedars in temperate zones) and other hardwoods occur. Thirty-six separate and distinct varieties of hardwoods have been found in the region. In the short leaf pine, trees are quite common measuring from four to four and one-half feet in diameter and running 60 feet without a limb. Spruce and fir are also found in quantity, although pine constitutes approximately three-fourths of the Temperate Zone Forest Belt. The rich timber resources have scarcely been touched, mainly because of inadequate transportation facilities. In the whole region, covering approximately 75,000 square miles, there are less than 1,000 miles of railroads. When new roads which are contemplated or in course of construction have been completed vast tracts of virgin forest land will be ready for exploitation.

One must not imagine, however, that there is at present no development of this belt. Some exportation is now taking place, the timber being mostly white pine of an excellent quality. Turpentine and rosin of a high grade are secured as by-products. In the State of Chihuahua, for example, which is one of the leading lumber states of the Temperate Zone area, the forest products of the State for 1909 amounted to $1,214,784, consisting principally of pine, $574,236; oak, $548,766, and mesquite, $43,991.

From all of this it may be seen that Mexico has large areas of timber, both of the cabinet and of the commercial woods. Here are splendid opportunities for the investment of American capital, if the problems raised by a lack of labor and of transportation facilities can be successfully overcome. The woods of the Temperate Zone Forest Belt are said to rival in quality those of the United States, and it is only a matter of time when both forest belts will be exploited on a large scale. Is this development to be carried on by American interests, or by the European capitalists who already dominate Mexico financially? American business men must decide.

CONSIDER THE WOODLOT TO KEEP IT PRODUCTIVE

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.00
THE LUMBER INDUSTRY—By R. S. Kellogg	1.10
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	2.00
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	1.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.35
LUMBER AND ITS USES—R. S. Kellogg	1.15
THE CARE OF TREES IN LAWN, STREET AND PARK—B. E. Fernow	2.17
NORTH AMERICAN TREES—N. L. Britton	7.30
KEY TO THE TREES—Collins and Preston	1.50
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record	1.75
PLANE SURVEYING—John C. Tracy	3.00
FOREST MENSURATION—Henry Solon Graves	4.00
THE ECONOMICS OF FORESTRY—B. E. Fernow	1.61
FIRST BOOK OF FORESTRY—Filibert Roth	1.10
PRACTICAL FORESTRY—A. S. Fuller	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel B. Green	1.50
TREES IN WINTER—A. S. Blakeslee and C. D. Jarvis	2.00
MANUAL OF THE TREES OF NORTH AMERICA (exclusive of Mexico)—Chas. Sprague Sargent	6.00
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume	7.50
HANDBOOK OF THE TREES OF THE NORTHERN U. S. AND CANADA, EAST OF THE ROCKY MOUNTAINS—Romeyn B. Hough	6.00
GETTING ACQUAINTED WITH THE TREES—J. Horace McFarland	1.75
PRINCIPAL SPECIES OF WOOD; THEIR CHARACTERISTIC PROPERTIES—Chas. H. Snow	3.50
HANDBOOK OF TIMBER PRESERVATION—Samuel M. Rowe	5.00
TREES OF NEW ENGLAND—L. L. Dame and Henry Brooks	1.50
TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst	1.50
TREES—H. Marshall Ward	1.50
OUR NATIONAL PARKS—John Muir	1.91
LOGGING—Ralph C. Bryant	3.50
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott	2.50
FORESTRY IN NEW ENGLAND—Ralph C. Hawley and Austin F. Hawes	3.50
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves	1.50
SHADE TREES IN TOWNS AND CITIES—William Solotaroff	3.00
THE TREE GUIDE—By Julia Ellen Rogers	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary	2.12
FARM FORESTRY—Alfred Akerman	.57
THE THEORY AND PRACTICE OF WORKING PLANS (in forest organization)—A. B. Recknagel	2.10
ELEMENTS OF FORESTRY—F. F. Moon and N. C. Brown	2.20
MECHANICAL PROPERTIES OF WOOD—Samuel J. Record	1.75
STUDIES OF TREES—J. J. Levison	1.75
TREE PRUNING—A. Des Cars	.65
THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss	3.00
SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY—By James W. Toumey	3.50
FUTURE OF FOREST TREES—By Dr. Harold Unwin	2.25
FIELD BOOK OF AMERICAN TREES AND SHRUBS—F. Schuyler Mathews	2.00
FARM FORESTRY—By John Arden Ferguson	1.30
THE BOOK OF FORESTRY—By Frederick F. Moon	2.10
OUR FIELD AND FOREST TREES—By Maud Going	1.50
HANDBOOK FOR RANGERS AND WOODSMEN—By Jay L. B. Taylor	2.50
THE LAND WE LIVE IN—By Overton Price	1.70
WOOD AND FOREST—By William Noyes	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.	2.50
MANUAL OF POISONOUS PLANTS—By L. H. Pammel	5.35
WOOD AND OTHER ORGANIC STRUCTURAL MATERIALS—Chas. H. Snow	5.00
EXERCISES IN FOREST MENSURATION—Winkenwerder and Clark	1.50
OUR NATIONAL FORESTS—H. D. Boerker	2.50
MANUAL OF TREE DISEASES—Howard Rankin	2.50
THE BOOK OF THE NATIONAL PARKS—By Robert Sterling Yard	3.10
THE STORY OF THE FOREST—By J. Gordon Dorrance	.65
FOREST MANAGEMENT—By A. B. Recknagel and John Bentley, Jr.	2.60
THE FOREST RANGER AND OTHER VERSE—By John Guthrie	1.60

*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

SPRUCE TREE 573 YEARS OLD

IN making a survey of the spruce forests, where the airplane cutting was carried on during the war in the Grays Habor spruce district, the Forest Service found a tree 573 years old, according to its rings. The tree was felled in clearing to make the military camps safe after a limb had fallen and menaced the roof of the officers' quarters. The tree is close to the Olympic highway, eleven miles north of Humptulips.

The stump was 11.6 feet from the ground level. The tree was a sapling some two inches in diameter when Columbus was discovering America. Though not the oldest spruce on record, it is premier in age during the present survey.

An effort is being made by the department to get the age of the largest type of Sitka spruce in each of the various airplane enterprises. More than 500 trees have been listed to date.

BOOK REVIEWS

FOREST MANAGEMENT, by A. B. Recknagel and John Bentley, Jr., John Wiley & Sons, New York, price $2.60. The book contains a condensed and simple treatment of the following subjects: Forest mensuration, Forest organization, Forest finance, and Forest administration and it is written in such a manner as to be readily understood and used by the layman, timber owner and manager. Non-professional students of forestry in colleges and universities and in professional courses not post-graduate grade, will also find it of value as a text.

Forest Management occupies the middle ground between the highly technical and the very elementary textbooks and intelligent study of the principles advocated in this book will stimulate the practice of forest management by owners of timber land—large and small, public and private—to the end that this important natural resource may be systematically maintained and developed.

RED GUM TREE YIELDS BALSAM OF TRADE VALUE

FEW people in the South, where the red gum tree (Liquidambar styraciflua) grows, apparently are aware that the gum which exudes from this tree when its sapwood is wounded has commercial value. This "sweet gum," as it is commonly called, is similar in properties and composition to the commercial product obtained from a tree (Liquidambar orientals) indigenous to Asia Minor and known in commerce as "Oriental storax."

According to the United States Forest Products Laboratory at Madison, Wisconsin, small amounts of the dried gum have been used for some time in the manufacture of chewing gum, but since the war curtailed the supply of oriental storax considerable quantities of the fresh "sweet gum" or "American storax" have been put on the market to replace the imported product.

As much as $2 a pound has been paid to collectors of the gum and second hands have sold it for from $2.50 to $3 a pound. These prices, however, are inflated and it is probable that in normal times the gum would not bring more than 50 cents to $1 a pound.

Storax is used in the manufacture of perfumes, tobacco, adhesives and pharmaceutical preparations, and contains cinnamic acid and cinnamic alcohol, both of which are in demand.

PLANT MEMORIAL TREES

STATE NEWS

CALIFORNIA

THAT public sentiment in California in favor of forestry is steadily growing is shown by the measures which passed the last Legislature and received executive sanction. Besides the general appropriation bill which carries items of salaries, support and printing of the State Board of Forestry, ten other measures which have to do with forestry in California were passed.

A new board of forestry was created to consist of five persons, the State Forester and four persons appointed by the Governor, one of whom shall be familiar with the timber industry, one with the livestock industry, one with the grain and hay industry, and one at large. Another measure provided for the prevention and suppression of forest fires which are defined as any fires burning uncontrolled on any lands covered wholly or in part by timber, grass, grain or other inflammable vegetation. The State Board of Forestry was authorized to divide the state into districts, employ district fire rangers and pay fire-fighting expenses under specified conditions. It was provided that co-operative agreements for the prevention and suppression of forest fires or for reforestation and afforestation purposes might be entered into with federal, county, municipal and private agencies. An appropriation of $25,000 for the biennial period was made to put this measure into effect.

In addition, a number of forested and brush-covered regions in the state were given protection through the following appropriations for the biennial period:

Fighting forest fires, etc., in the San Dimas Canyon in the San Gabriel Mountains, $1,600; fighting forest fires in the San Gabriel Canyon in the San Gabriel Mountains, $3,000; prevention of forest fires in the San Antonio Canyon in the San Gabriel Mountains, $5,000; for reforestation, construction and maintenance of fire lines and trails, Angeles National Forest, $5,000; prevention and extinguishment of fires in Tamalpais forest fire district, $5,000.

The above appropriations were made on the condition that the various agencies receiving direct benefit from this protection, such as the San Dimas Fruit Exchange, Azusa Irrigation Company, San Antonio Water Company and Tamalpais forest fire district contribute an equal amount.

Law enforcement measures were strengthened through an amendment to the Penal Code that requires an effective spark arresting device to be installed on any gas tractor, oil-burning engine, gas-propelled harvesting machine or auto truck harvesting or moving grain or hay, and the carrying of two suitable chemical fire extinguishers by harvesters and hay presses. The section regarding the leaving of camp fires unextinguished was strengthened by the substitution of the words, "Without some person in attendance" for "upon departure."

A chapter in the Civil Code was revised and now gives the United States the right, heretofore limited to the state and counties, of recovering in a civil action of double the damages sustained from fires through wilfulness, malice or negligence, as well as the actual damages if the fires occurred accidentally, and the full costs incurred in fighting any such fires.

COLORADO

ACTING upon the advice of the State Forester, the State Board of Land Commissioners has definitely committed itself in favor of effecting an exchange of school lands, chiefly sections 16 and 36, lying within the National Forests of the State, for an equal acreage and value of lands to be chosen in one or two bodies within some National Forest, in order that a State Forest may be created and handled under forestry principles.

The State Forester, together with Crosby Hoar, of the United States Forest Service, has examined within the Rout, White River and Arapaho National Forests areas which might serve the purpose of the State. During the summer a crew of National Forest men are examining State lands which have not been examined by the State Forester, and the Forest Supervisors are assisting on other National Forests.

Preliminary to this exchange the State Forester has reported on nearly 28,000 acres of State land within National Forests, but the total area of such lands is approximately 115,000 acres.

The timbered school lands in the past have been administered with great handicaps due to the small areas in single bodies, scattered all over the mountainous portion of the State, and under laws and regulations which were not conducive to good forestry practice.

It is believed that the proposed exchange, which is in a preliminary stage at present, will result, if effected, in marked advantage to the State and in considerable advantage to the United States Forest Service, which will not have to contend with the administrative disadvantages of holding within the boundaries of National Forests certain alienated areas.

LOUISIANA

THE Commissioner of Conservation, with the approval of the Forestry Advisory Board, has formally promulgated the spark arrester regulations called for by the Louisiana law passed in 1918. Louisiana, which has so many excellent forestry laws, feels proud to join those few states in the Union which have laws requiring the use of proper spark arresters and ash pans on the trunk lines and tram roads of the state. So far as we know the regulations for wood-burning locomotives and skidders are the first passed by any state; wood as a fuel is not used to any extent today in logging operations except in the South, where our splendid fat pine knots make a mighty fine substitute for coal. The regulations as issued require coal burning locomotives to be equipped with "cabbage-head" stacks and solid ash pans. The coal-burning regulations require no more than what is already the standard equipment on the great majority of railroads in the United States and are modeled along the lines of the British Columbia and New York regulations. There will be, however, a tightening up of the inspection under our regulations. Skidders and loaders or other portable engines used in the woods must be equipped with screens in or over the smoke stacks.

The way the lumbermen and railroads of the state have co-operated with the Department of Conservation in these matters is a very hopeful sign. Two conferences called by the department in March, one for the tram roads, the other for the trunk lines, were very well attended and gave an opportunity for everyone to be heard. A great many of the tram roads did not wait for the issuance of the spark arrester regulations to begin to install the devices recommended by the conference, but got busy at once and ordered the equipment. Other of the tram roads were found to have used cabbage-head stacks and similar devices for many years and they were unanimous in boosting the department's efforts to eliminate railroad fires.

Never again when the fire warden talks to the Louisiana farmer or stockman about preventing fires in the woods can that individual come back and say "why do you pick on us? These —— —— dummy engines and locomotives set more fires in a day than we do in a week. Why don't you get after them?" We feel that if the farmers and stockmen will give us as good co-operation as the lumber companies and trunk lines seem to be willing to give us under the new regulations, we shall soon have the fire situation in Louisiana eating out of our hands.

"The Dessert Berry of the Nation"

The Erskine Park Everbearing Red Raspberry

The Erskine Park Everbearing Red Raspberry is a seedling from the old reliable Cuthbert, discovered on the Westinghouse Estate (Erskine Park) at Lee, Mass., by Mr. Edward Norman. This magnificent estate is in the midst of the beautiful Berkshire Hills, with a temperature in winter of 30 or 40 degrees below zero, so that the hardiness of this berry is unquestioned. The estate is surrounded by the summer homes of many wealthy people, and much to the surprise of his neighbor gardeners and not without a deal of personal satisfaction, Mr. Norman furnished large, luscious raspberries throughout the fall for various dinner parties.

These berries are commented on by all who have seen and tasted them as the most delicious and best raspberry they have ever eaten. Mr. Baker of Hoosick Falls, N. Y., writes us as follows, regarding this remarkable berry:

"In the season of 1916, Mr. George M. Darrow of the United States Department of Agriculture was traveling from the Atlantic to the Pacific, visiting fruit growers to obtain information on berries for bulletins published by the Department of Agriculture. Mr. Darrow had visited this estate before, and was most favorably impressed that this berry was far ahead of the St. Regis and Renere, and when it became known it would replace these varieties. The plant is by far the strongest growing raspberry I have ever seen. It branches like a tree, and it also has the largest and most roots of any variety with which I am acquainted. It is perfectly hardy and the berries are very large."

Of this berry we cannot say too much in praise, and we predict that once known, it will be a standard for planting in every garden and considered a necessity.

The Renere and St. Regis have been the standard up to the present time. In the Erskine Park we have a berry that far surpasses either of these; a raspberry that is a delight to eat, each berry being of largest size, with its delicious melting flesh, full of rich creamy juice, highly flavored and sweet as honey.

Conceive the joy and satisfaction of having such berries on your table all through the autumn, the source of wonder to your neighbors, that you can pick the finest raspberries until the snow flies. On November the 20th we cut a large branch of the Erskine Park with **blossoms, green berries** and **ripe fruit** upon it.

We have not as yet been able to propagate any large quantity of this magnificent berry, but what we have are the finest **Bearing Two-Year Old Plants,** heavily rooted and branched that will bring a full measure of pleasure and satisfaction to the planter.

Strong Field Grown Bearing Plants, per six, $3; per twelve, $5; per fifty, $15

One dozen plants set this fall will produce more fruit than two dozen plants set next spring. Plant this fall.

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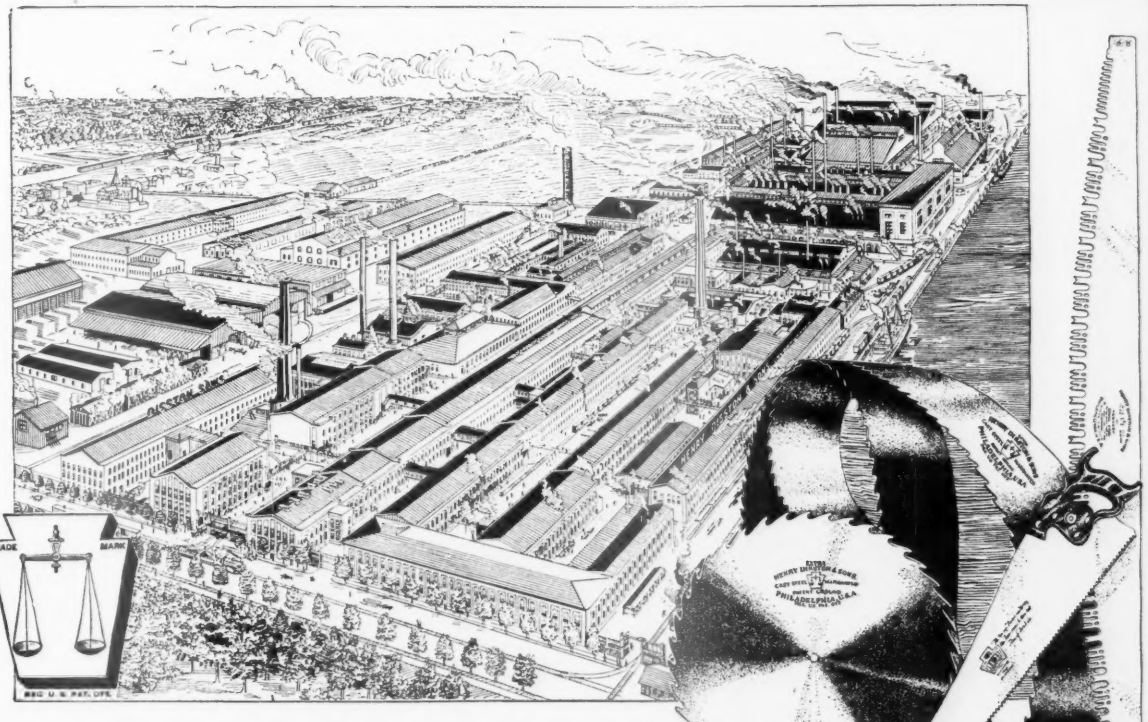

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Stumpage Prices.—Lowest rates considered, $3.00 per M. feet for yellow and jeffrey pine, $3.50 per M. feet for sugar pine, $1.50 per M. feet for Douglas fir and incense cedar, $.75 per M. feet for white fir and $1.00 per M. feet for red fir. For material unmerchantable under the terms of the agreement to be removed at the option of the purchaser, for which payment is required by the Forest Service, fifty cents per M. feet. Rates to be redetermined by May 1, 1924.

Deposit.—With bid $10,000 to apply on purchase price if bid is accepted or refunded if rejected.

Final Date For Bids.—Sealed bids will be received by the District Forester, San Francisco, California, up to and including October 15, 1919.

The right to reject any and all bids is reserved.

Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, San Francisco, California, or the Forest Supervisor, Quincy, California.

MICHIGAN

THE past summer found the compartment line construction work practically completed on two State Forests, the Fife Lake and the Ogemaw. On each of these, a compartment line has been built on the government land subdivision survey lines around each forty acre tract, excepting where swamps or lakes interfere. The Fife Lake Forest contains 7182 acres and the Ogemaw 4284 acres, and the compartment line systems are 112 and 57 miles long, respectively.

In addition to the systems built on these two forests there are some 380 miles on the other State Forests, and the present systems will be strengthened with more line until each forest is equipped as is each of the two mentioned.

These two forests are, probably, the first in America to be so equipped. Since the construction and maintenance of the lines entails considerable cost, it is interesting to note, as offsetting the cost, their value in a general way to the forest in the light of our own experience. To be sure European foresters long ago were satisfied that the construction of compartment lines was essential to the efficient operation of their forests, and the more intensively managed forests of Europe are now well provided.

The lines, as we construct them, are cleared of brush and trees to a width of sixteen feet, all stumps are removed to a width of twelve feet, and a strip ten feet wide is plowed and harrowed. The line is reharrowed or is disced as necessity arises, to remove all grass, ferns, brush, etc., which may start on it. A clean dirt road results. They are the streets of our forests.

As streets they serve the same purposes and have much the same relative value to the forest as do the streets to a city. Along them, one may quickly drive to any fire which may arise, and as the streets of a city act as barriers to the spread of fires, and as bases from which fires may be fought, so do the compartment lines of the forest. Indeed, their value as a means of protecting the woods from serious damage by forest fires is, perhaps, their greatest value at present, and as their use for this means is readily observed, they are generally called fire lines. It is along the compartment lines that telephones are strung, and it is they that, in large measure, bear the vehicular travel over the forest.

The compartments correspond in boundaries with the government land subdivisions, and as each land subdivision is described, so is each compartment line bounding it. Thus we have as names for our forest streets, the names of subdivision lines, for example: north eight line section 36; east and west quarter line section 2; line between sections 11 and 12; etc. The name of the line indicates its precise position in the forest.

The forest is, by the lines, divided and marked out on the ground (not along on a map) into units of area suitable for administration purposes. If the Custodian wishes to plant a compartment with young trees, he knows that the area is bounded by compartment lines, and that its location is unmistakable; also that he can get to it with a team, if, indeed, not with his Ford.

If the State Forester wishes to undertake special surveys or studies or examinations on any particular piece of land, he knows that he can reach it quickly, and that the ease of his work will be immeasurably heightened through the use of the compartment lines. It is only the forester who has hunted for section corners and lines in order that he might locate his position, who can really appreciate this one value of the compartment line system in the efficient conduct of a forest business.

The Forestry Section of the Michigan Agricultural Experiment Station is making a study this summer of the rate of growth of forest plantations and also nut tree plantations. The study includes costs of establishing, care and maintenance and also intermediate and final returns where possible. The results of the study will probably be published some time during the coming winter.

The Michigan Legislature recently passed a law to encourage the planting of nut-bearing and other food-producing trees along State trunk highways and other roads built in this state. The law makes it the duty of the State Highway Commission and the State Commission of Agriculture to look after the setting out of such trees and of the State Agricultural College and the Public Domain Commission to distribute stock at nominal cost to local officials and private individuals who will set it out. Trees are to be planted at intervals of 20 to 40 feet along the roads. This law is in keeping with the policy of encouraging tree planting announced by the U. S. Department of Agriculture.

NORTH CAROLINA

TEN years ago the United States Forest Service, in co-operation with the North Carolina Geological and Economic Survey, made a study of the Wood-using Industries of the State, the results of which were published by the Survey as Economic Paper No. 20, "Wood-using Industries of North Carolina." This report is now out of print and as there is a continuous demand for information on this subject, the Survey has determined to revise thoroughly and bring up to date this report and publish the results in connection with the forthcoming bulletin on the "Forest Conditions of Piedmont North Carolina," in which portion of the State most of these industries are situated.

Inquiry cards have been printed and are being sent out to a revised list of firms ask-

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New York

ing information as to the amount, kind, quality and value of wood used, and the amount and kind of products manufactured. A special effort is being made to compare the past with the probable future source of supply. Ten years ago North Carolina furnished ninety-six per cent of the wood used in her industries; it will be interesting to see to what extent this has been changed by the undoubted rapid reduction in the amount and quality of timber available.

Besides the several large summer schools, covering six weeks study, in session at the higher State institutions of learning, there are being held this year for the first time some forty-five schools of four weeks duration for teachers, under the joint control of the State and County authorities. The attendance and the work accomplished at these local schools have been most encouraging. It is at these summer schools, held usually at the county seats, as well as at the Teachers' Institutes (two weeks term), that the State Forester is lecturing. With a lantern and a set of slides, he is visiting the majority of the summer schools in the Piedmont and eastern sections of the State. The general topics are "conservation" and "forestry" as they apply especially to North Carolina conditions. An outline of the different forest types is given, the uses of the forest touched upon not only as to their products, but their value for recreation and for soil and water protection; while forestry practice for this State is illustrated and explained. Suggestions are made to the teachers as to how they may interest the children in the observation and study of trees by excursions, school collections, Arbor Day observance, etc. They are urged to recommend the planting of shade trees around schools and homes, the reservation and planting of roadside trees and the planting and dedication of Memorial Trees.

OREGON

AT a recent meeting in Portland, Oregon, of the trustees of the Western Forestry and Conservation Association, plans were ratified for reorganizing the scope and personnel of the association to cover far more broadly than ever before both the western protective work and the economic problems confronting the entire industry.

Favorable action was taken on a co-operative plan proposed by the Oregon Forest Fire Association, under which Col. C. S. Chapman, manager of the latter, will take charge of all the fire and similar local work in the five states. The five-state association will furnish him assistance to develop technical fire fighting methods and law enforcement, also increased facilities for educational work with industry and public on protective matters.

Besides these increased activities in the Northwest, the Western Forestry and Conservation Association will engage more constantly, both independently and in co-operation with the National Lumber Manufacturers Association and other lumber and timber organizations, in working out larger industrial questions and in getting recognition of western needs from governmental agencies. By being relieved of western fire matters, E. T. Allen, who has spent much of the past three years in Washington, will devote himself almost entirely to this work in the east. Much of his earliest attention will be given to relations between the lumber industry and the Treasury Department in working out the new revenue laws affecting income and profits taxation.

PENNSYLVANIA

FORESTER Paul Mulford, in charge of the Stone Forest and Asaph nursery reports that he is raising seedlings in his nursery from seed collected from white ash trees which were set out in a plantation on the Stone Forest in 1907. The trees bore their first seed in 1914 and have been prolific seeders each year since then, except in 1918 when a late frost killed the immature seed. He also reports a heavy attack of white pine weevil, especially on southern exposures, and states that European larch under an advance growth is making only about one-fourth as great a height growth as in the open.

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SALE OF TIMBER, KLAMATH INDIAN RESERVATION.
CLIFF BOUNDARY UNIT.

SEALED BIDS, MARKED OUTSIDE "BID, Cliff Boundary Timber Unit" and addressed to the Superintendent of the Klamath Indian School, Klamath Agency, Oregon, will be received until 12 o'clock noon, Pacific time, Tuesday, September 23, 1919, for the purchase of timber upon about 10,000 acres within Townships 33 and 34 South, Ranges 7 and 8 East of the Williamette Meridian. The sale embraces approximately 100,000,000 feet of yellow pine and sugar pine. Each bid must state for each species the amount per 1,000 feet Scribner decimal C log scale that will be paid for all timber cut prior to April 1, 1924. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three-year periods. No bid of less than three dollars and seventy-five cents ($3.75) per 1,000 feet for yellow and sugar pine and one dollar ($1.00) per 1,000 feet for other species of timber during the first period will be considered. Each bid must be submitted in duplicate and be accompanied by a certified check on a solvent national bank in favor of the Superintendent of the Klamath Indian School in the amount of $10,000. The deposit will be returned if the bid is rejected but retained if the bid is accepted and the required contract and bond are not executed and presented for approval within sixty days from such acceptance. The right to reject any and all bids is reserved. For copies of the bid and contract forms and for other information application should be made to the Indian Superintendent, Klamath Agency, Oregon.

Washington, D. C., July 14, 1919. CATO SELLS, Commissioner of Indian Affairs.

FORESTER wanted as Division Firewarden in New Jersey. Must have professional training and some experience. Salary $100 to $120. Eligible for promotion to Assistant Forester. Civil Service examination can be taken after provisional appointment or by mail. Box 810, care American Forestry Magazine, Washington, D. C.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

An Opening For One Hundred Foresters

The position is that of Division Firewarden; the territory is approximately one-third of the State of New Jersey; the work is general administration of all forest fire matters together with attendance at large fires, investigation of the causes of fires, supervision of the personnel of the local firewarden service, about one hundred men, and responsibility for the publicity and propaganda fire prevention work in the territory. The compensation is $1,200 to start, with every likelihood of increase shortly, the qualifications are that a man shall be a graduate of some reputable technical forestry school. The reason for requiring technical training is that advancement may be either in the forest fire work or in the technical forestry activities of the Department and in addition the incumbent is called on during the slacker season for forest fire work, to do technical and propaganda forestry work in his territory. Apply Box 830, care American Forestry, Washington, D. C.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

Forester A. C. Silvius in charge of the Buffalo State Forest in Pennsylvania has established a recreation park within his forest. It has been named Crystal Spring Park, covers an area of about three acres, and is located on one of the main highways of the State.

A forestry literature box has been installed in which popular publications on forestry are placed. These publications are a source of recreation to the visitors during their stay at the park, and a means of disseminating information pertaining to forestry, for the publications are free of charge and may be taken home by the visitors. Approximately 2,000 bulletins and leaflets have been distributed during the past four months. Forester Silvius is using this practical means of convincing the guests who visit the park that he is trying to give them real service and the Buffalo Forest is open to the public and being developed so that it will yield large quantities of desirable wood and furnish the best form of recreation to all who are fortunate enough to visit it.

District Forester Walter D. Ludwig, Johnstown, Pennsylvania, reports that a number of destructive forest fires occurred during the first week of July. At this season of the year forest fires are usually rare, but on July 4 a fire started which destroyed more than $1,000 worth of pulpwood belonging to the West Virginia Pulp and Paper Company.

Hereafter any person who desires to make a business of pruning shade trees in Johnstown, Pennsylvania, must pass an examination given by District Forester Walter D. Ludwig. If the applicant satisfies the requirements of the examiner, a license is issued to him upon the payment of a one dollar fee.

VIRGINIA

SEEDLINGS and transplants for reforestation in Virginia will be available for the first time this fall planting season from the Virginia State Forest Nursery.

Evergreens are being grown exclusively up-to-date. They include three species of pine and Norway Spruce. The pines are the well-known white pine (pinus strobus), which is native throughout the mountainous parts of the State and the higher parts of the Piedmont section; the shortleaf pine (pinus echinata), which is the predominating tree in the Piedmont section of the State, and is also found over much of the mountainous part; and the loblolly pine (pinus taeda), which is decidedly the predominating tree in the Tidewater or Coastal Plain section of the State, and occurs scatteringly, and grows rapidly in the Piedmont section of the State. These three pines are expected to predominate in reforestation in Virginia, each in its own section of the State, because of their rapid growth, dense stands, and early and large yields of much-needed material.

The Norway spruce has been planted with much success in many of the Northern States, and is expected to thrive in Virginia, at least in fairly cool and moist situations. It also grows rapidly and in dense stands, producing useful wood.

The number of trees which are expected to be available for use this fall and next spring is as follows: white pine, trans-

plants, 17,000; shortleaf pine, transplants, 13,000, and seedlings, 1,400; loblolly pine, transplants, 8,000, and seedlings, 7,500; and Norway spruce, transplants, 1,000.

Rules for the disposal of these plants will probably provide for distribution to public institutions free of charge, and to land-owners in Virginia at a cost low enough to encourage reforestation and based on the cost of raising them. Trees of the species and sizes desirable for forest planting are not grown by any commercial nursery in Virginia, and it is expected that the example of the State will result in such nurseries putting such material on the market after the market has been developed by the State.

The State Forest Nursery is located at Charlottesville, Virginia, a junction point of the Southern and Chesapeake and Ohio Railroads, on ground belonging to the University of Virginia and placed at the disposal of the State Forester free of charge for this purpose.

TEXAS

MR. ALFRED MACDONALD, a graduate of the Harvard Forest School, has been appointed City Forester for the City of Dallas. City forestry is new in Texas, Dallas being the only municipality boasting of such work. Many other Texas cities have beautiful trees and splendid possibilities and it is to be expected that they will follow the lead set by Dallas when the benefits of such work are appreciated.

A resolution was recently passed by the State Legislature advocating the planting of pecan trees along state and county highways. The pecan is the official State tree and although it is not suited to conditions in all parts of Texas, yet there are many

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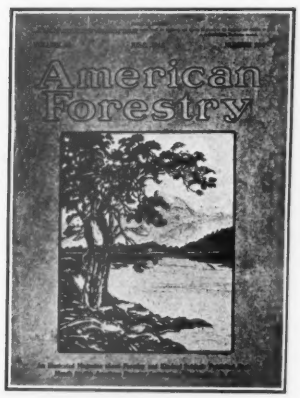

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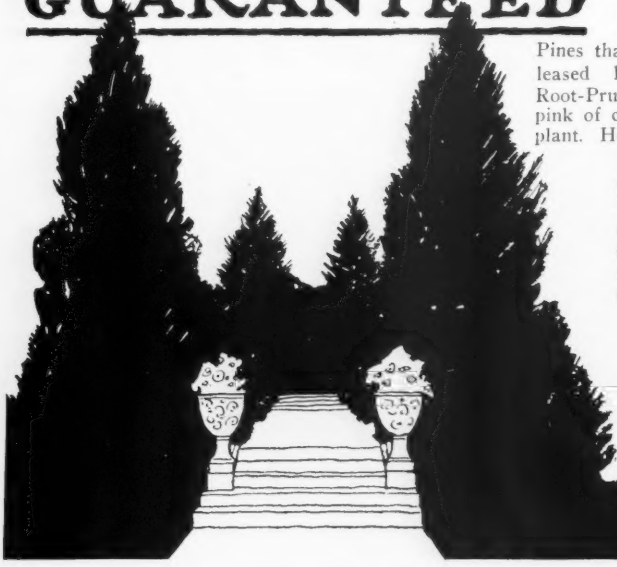

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WISCONSIN

TO put its discoveries into practical use as soon as pos ible, the Forest products Laboratory, Madison, Wisconsin, has adopted the plan of sending out at short intervals a sheaf of so-called "Technical Notes." These notes are not too technical, however, for the average wood worker. They are simply practical suggestions backed up by many tests, on such subjects as how to build boxes and crates, make waterproof glue joints, prevent decay in wood, tell commercial woods apart, or keep doors from shrinking and swelling. The notes are distributed in quantity to the wood-using associations, to technical schools and colleges, and upon request to all others who might benefit by them.

A knowledge of the properties of wood is as essential for aircraft repair men as for aircraft builders. The new school for airplane mechanics at the Great Lakes Naval Training Station will give Navy aircraft repair men a thorough training in the selection and treatment of airplane woods. Instructors in this school have been detailed for some time to the Forest Products Laboratory at Madison, Wisconsin, to collect information for use in their courses. The laboratory is also furnishing the school material for a text book on wood identification, inspection, conditioning and testing.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE Canadian Forestry Association is just sending on the road, for the second season its "Forestry Car." This is a special car fitted with all sorts of fire fighting apparatus, a miniature nursery, samples and pictures of wood manufactures, moving picture apparatus and lectures. This car is sent to regions which have large timberlands or industries and also stops for lectures in the larger cities. Audiences of 600 at one meeting are not uncommon. This kind of propaganda has proved most effective, especially in districts which have been foci of forest fires in the past. Mr. Black, the Secretary, is to be congratulated on his cleverness in devising novel propaganda methods in the efficient way in which he has carried them out.

Sales of timberlands in Ontario, recently made by the Government have realized the highest prices ever paid, in one case $22.00 per thousand feet, standing.

The Government of New Brunswick has again advanced the dues on timber cut on Crown Lands by one-third and has put into force new cutting regulations. This will mean an increase in revenue of $150,000 if the cut is the same as last year. Spruce, pine, tamarack and cedar will pay $3.50 per thousand instead of $2.50; hemlock, fir and poplar $3.00 instead of $2.00. Spruce and white pine shall be cut not less than 12 inches in diameter measured inside the bark not less than 12 inches from the ground. Jack pine, or "Princess Pine" as it is called locally, not less than 10 inches. Fir not less than 9 inches. A fine of $50.00 per tree in addition to the regular stumpage is imposed. Trees must be utilized to a six inch top and a penalty of $7.50 per thousand will be imposed for all usable material left in the wood in contravention o the regulations. In case of fire or blow down the Government may compel the licensee to cut and remove such timber before it becomes unusable. If he does not remove such timber he must pay the stumpage in any case. Trees killed by fire or budworm shall only pay two-thirds the stumpage of sound trees. New Brunswick is advancing rapidly along forestry lines and should be heartily congratulated.

The Brown Corporation has bought a hydroplane for mapping their timber lands and has decided to undertake planting operations on their holdings in the United States, planting four trees for every one they cut. They are undertaking this as a patriotic duty. We hope there will be more like them, and venture the statement that after fifteen or twenty years they will be very thankful that they were so patriotic and far sighted.

In traveling through southern Quebec and northern Maine much damage to balsam and spruce by budworm was noticed.

Plantations of Scotch Pine in Quebec are showing damage from white pine weevil, from a fungous disease and from a rust. Several trees are showing this years shoots falling off and it looks as if the damage is due to mice. Altogether this species does not seem to be a good one to plant.

Norway spruce plantations are doing remarkably well, growth this year being in many cases from two to three feet. Plantations made in 1914, four year old stock, are now six feet and over on fair soils.

Fires in the Prairie Provinces have been disastrous this summer and have been very difficult to control. Northern Ontario has also suffered quite a little.

Arrangements are being made by Dr. Howe of the Commission of Conservation with a number of the large paper and lumber companies to have certain areas cut this next winter under regulations drawn up by him and under the supervision of his men. This will mean some additional slight cost of logging but will furnish very important information in regard to the effect of different systems of cutting. Such co-operation is very valuable and should be encouraged and as widespread as possible.

AIRPLANES FIND FOREST FIRES

REPORTS to the Forest Service, United States Department of Agriculture, from the national forests in California, where Army aviators are making daily flights in search of forest fires, indicate that the innovation has been decidedly successful and that air patrols of the forests will prove so valuable that they will eventually become a permanent part of the work to shield the great woodlands from conflagrations. Numerous fires have been discovered in their early stages by the aviators and have been reported immediately to the forest rangers. It is believed that considerable loss has been prevented by such early discovery. Lack of suitable landing places in this rugged country has proved a handicap in some instances and has caused a belief in certain quarters that dirigible balloons will finally be found more suitable than airplanes for forest flying.

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FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

OF the three faculty members who were in in the army, Major David T. Mason was the first to return. After being with the school for two months, he was borrowed for the rest of this year by the Treasury Department and will be in Washington until January 1st as timber expert.

Captain Donald Bruce returned to take up his work in Forest Engineering on June 1st after 21 months service in France. While with the A. E. F. he was engaged in securing from the French the timber which was later cut by the 10th and 20th Engineers.

Captain Emanuel Fritz took up his duties as Assistant Professor of Forestry, in charge of the work in forest products on July 1st, after nearly two years in military service.

Professor Walter Mulford, head of the Forestry School, has been given added administrative duties and responsibilities in the recent reorganization of the College of Agriculture. He is now Director of Resident Instruction and chairman of the administrative committee, in which capacity he will have direct supervision of the entire student body of the College of Agriculture. In spite of this added work he plans to give his usual forestry courses next spring.

Dr. Charles H. Shattuck, who was with the school as professor of Forestry from August 1917, until January of this year, has gone into private work with his brother at Idaho Falls, Idaho.

Professor Woodbridge Metcalf has just returned from a trip to the southern part of the state in connection with his study of eucalyptus plantations and the supervision of the Santa Monica Forestry station. He spent a few days with Supervisor Tillotson of the Cleveland National Forest on an inspection trip in the San Jacinto Mountains.

Charles E. Van Riper (20) has brought his bride with him from France and intends to complete his college course.

A. E. Wieslander (15) was married in June to Miss Mabel Holmes of Berkeley. He has taken his bride to the Lassen National Forest where he is engaged as Forest Assistant.

Myron E. Kruger (16) stopped in for a visit on his way from France to Linton, Oregon where he has accepted a position with a large lumber company.

Alex. Muzzall (16) paid a visit on his way to Sumatra where he has gone to manage some of the Goodyear Rubber Company plantations.

Lieutenant Ansel Hall (17) has just returned from some very interesting work under Colonel Greeley in France and is returning to his work with the National Park Service. He has been assigned to a district in the Yosemite National Park.

C. O. Gerhardy (20), G. W. Byrne (22) and J. E. Pemberton (22) are getting some logging experience with the Hammond Lumber Company, Eureka, California.

R. C. Burton (14) is with a reconnaissance party on the Lassen National Forest this summer but will return to his work at the Santa Cruz High School in the fall. He is giving the only High School forestry course in California.

R. W. Beeson (20) is at Ephraim, Utah, at the Great Basin Experiment Station for the summer, working on grazing reconnaissance.

COLORADO AGRICULTURAL COLLEGE

DURING March, 1919, some 25 or more soldiers who had suffered wounds or gassing or had developed incipient tuberculosis were sent to the Colorado Agricultural College by the War Department to be given instruction along lines decided upon by Government advisors and the vocational soldier students in order that recuperation could be effected at the same time that training useful for later life could be given. Undoubtedly giving them something to do actually accelerates their physical improvement.

One young marine who had worked in citrus groves in Louisiana before the war is studying horticulture and, in the Department of Forestry, is studying, as a minor subject tree repair work with the view of repairing fruit trees, using the methods employed by "tree surgeons."

Another Marine who was gassed at Chateau Thiery is fitting himself to be a forest ranger.

Others are pursuing agricultural or mechanical subjects.

Almost without exception these soldiers display much enthusiasm in their studies and make good progress in spite of deficient early schooling in some cases. Accustomed as they are to discipline, they make ideal members of the student body.

The amount of work assigned to each is determined by his physical condition, since his health improvement is given first consideration.

IOWA STATE COLLEGE

THE Forestry Class of the Iowa State College has just completed a months camp on the Arapaho National Forest in Colorado. The men have been engaged in various Forest service operations, such as timber marking, scaling, logging and lum-

bering which has enabled them to gain experience along the practical lines of forestry. The camp was established in the lodgepole — Englemann Spruce country, where there are extensive lumbering operations which enabled the students to secure good experience along the utilization end of forestry. The class returned to Ames the first of September to continue the forestry work.

INDIANA

LIEUTENANT T. I. Taylor, who recently returned from one year's service with the aviation force overseas, is now practicing City Forestry at Evansville, Indiana. Mr. Taylor was graduated from the Forestry Department of Purdue University with the class of nineteen seventeen, leaving the University early for training in the Aviation Service. While in France, Lieut. Taylor had an exceptional opportunity of visiting many of the French State Forests.

Private Troy Fox, who returned from France in July after nearly two years' service with the Twentieth Engineers, has taken a position with the Forest Service in District 1. Private Fox reports some very interesting experiences in the forests of France, but much prefers the United States to the Landes.

Prof. Burr N. Prentice, who is in charge of the Department of Forestry at Purdue University is in the Northwest this summer in the employ of the Office of White Pine Blister Rust Control in the Bureau of Plant Industry. Co-operative work is being carried on in the five needle pine States of the west, to prevent the extension of the blister rust scourge into western territory.

The prospects are bright for a record registration in the Department of Forestry at Purdue University. Practically all upper class students will return, and elementary courses are going to be crowded.

MICHIGAN

THE Forestry Department of the Michigan Agricultural College is planning on collecting seed this fall from a white pine windbreak at the college. Two years ago 110 pounds of seed were obtained from this windbreak, which is half a mile long and consists of a double row of trees, spaced about 10 feet apart. The trees are 22 years old and have been bearing seed for some time. This was the first attempt that had been made, however, to collect the seed. The seed was collected by boys climbing the trees and cutting off the cones with a sharp blade on the end of a six-foot stick. The department has called the attention of farmers to the fact that at present prices there might be considerable money in collecting seed from windbreaks or even from individual trees of certain species.

During the spring term 106 freshmen took the course in farm forestry at the Michigan Agricultural College. This course is required of all students in the agricultural course. It covers the care and management of farm woodlands, planting, utilization of timber, basket willows, maple sugar making and other activities connected with the woodlot or better utilization of waste lands.

Through the courtesy of the Barrett Company the Michigan Agricultural College has obtained the use of a portable post treating plant, consisting of a tank, firebox and accessories. This plant will be loaned to farmers without charge other than transportation. Many farmers who have only a few posts to treat do not feel justified in getting special equipment, or do not understand the correct methods to use. The Forestry Department of the College plans to give demonstrations in various parts of the State.

Mr. E. C. Mandenberg, the Forestry Extension specialist of the college, has returned after a year's absence on war work. The Michigan Agricultural College was the first agricultural college to employ a man full time for such work. The college has had a forestry extension man for the last six years.

During the past spring the college shipped 180,000 trees from the forest nursery for planting in the State. Since 1909 over 2,100,000 trees have been shipped from the nursery. This is enough to plant an area of 2,000 acres. During the war but very few trees were sold, but the nursery is now getting back to its normal output. The trees used are largely transplants about 10 inches high.

IDAHO

THE School of Forestry, University of Idaho, at the request of the state board of land commissioners, has made a reconnaissance study of the state lands at Big Payette Lake for the purpose of working out a plan for the development of the timber resources of the tract and the recreational facilities of the water front. As a basis for recommendations to the state land board, the University party is making a topographic map of the tract and an estimate of the timber.

The state lands adjacent to the lake comprise some thirteen thousand acres, and the timber on about twenty-five hundred acres was sold last March. The contract under which the sale was made provides that the trees to be cut shall be marked or otherwise designated by the state agent in charge, that the timber left shall be protected from damage in logging operations, that the stumps shall be of a certain height, and that the brush shall be piled and burned or otherwise disposed of to the satisfaction of the state agent. Frank G. Miller, Dean of the School of Forestry, has been designated by the land board as state agent and

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placed in charge of the logging operations for the state.

The plan of cutting adopted is intended to preserve to the utmost the scenic value of the lake slopes. For the most part, the timber immediately along the lake shores will be left intact, a salvage cutting only being made here.

The terms of this contract constitute an important innovation in the management of timber sales on state lands in Idaho, and are attracting wide attention.

Dr. Henry Schmitz, of Washington University, at St. Louis, has just been called to the faculty of the School of Forestry. He graduated with honors from the School of Forestry, University of Washington, Seattle, in 1915. In September, 1916 he was appointed a fellow in the Shaw School of Botany of Washington University, St. Louis, from which he graduated in June, 1919 with the degree of Doctor of Philosophy, writing his thesis on the "Relation of Bacteria to the Decay of Wood." From July, 1917 to January, 1919, Mr. Schmitz was in the U. S. Naval Reserve Force where he served with distinction. He has had practical experience in the forests of the Northwest with both the U. S. Forest Service and private concerns. Dr. Schmitz comes to the School of Forestry with the best endorsements from those who know his work. Dr. G. T. Moore, director of the Missouri Botanical Garden, says of him, "As an investigator he has shown himself capable of conducting high grade work independently, and there is no reason why he should not make a distinct mark for himself because of his ability in research."

I. W. Cook, associate professor of forestry was with the Rose Lake Lumber company during the summer, engaged on stumping appraisal work.

NEW YORK STATE COLLEGE OF FORESTRY

"TAKE the Returning Soldiers Back," is the policy of the New York College of Forestry at Syracuse, at the head of which is Dean Hugh P. Baker, who won a commission as captain of infantry. Five returning soldiers have been given positions in the faculty of the college. All are men who were formerly with the college, and the appointments are as follows: Russell T. Gheen, formerly with the extension department, later with the Southern Pine Association, captain in field artillery, returning to the extension department for special work in New York state, particularly for lecture work.

Reuben T. Pritchard, assistant professor of silviculture, first lieutenant with Battery F, 345th Field Artillery, of Texas; George H. Cless, Jr., formerly of the extension department, later with the National Lumber Manufacturers association in charge of exhibits, first lieutenant with trench mortar battery in Italy, and in charge of a military commission to investigate food supplies in Hungary and Serbia after the armistice; Oliver M. Porter, Captain Quartermaster Corps, with troops in Europe, former faculty member; Allan F. Arnold, formerly with the extension department, who returns as sergeant, but with a special citation for bravery in action.

New Professor of Forest Extension

Warren B. Bullock, former Milwaukee newspaper correspondent and magazine writer, has been made professor of forest extension at the New York State College of Forestry, Syracuse, New York, marking what appears to be a new campaign of advocacy of forest development. Mr. Bullock has been in newspaper work in Milwaukee nearly 20 years, as reporter, editor and head of the news bureau bearing his name. He became interested in forestry while publicity manager of the National Lumber Manufacturers' Association.

The selection of Mr. Bullock for the eastern work evidently is a part of Dean Baker's plan to go to the people of the State with his advocacy of modern forestry methods.

PENNSYLVANIA STATE COLLEGE OF FORESTRY

THE Freshmen Forestry Camp of the Pennsylvania State College, was held on a 1400 acre tract of young timber near Lamar, Pennsylvania, which is about 30 miles from the College. This is the permanent camp site for Freshmen.

The Sophomore Camp was with the Central Pennsylvania Lumber Company at Laquin, Pennsylvania. The lumber mills at Laquin and Masten were studied and the logging operations at Hillsboro. Side trips were taken to study the many wood-using industries in the region.

Professor George R. Green, who has been in charge of the section of wood technology at the Naval Aircraft Factory, Philadelphia, returned to State College during July to give the work in Forestry and Tree Identification in the Summer Session of the College for teachers.

Lieutenant W. G. Edwards, Assistant Professor of Forestry, has returned from France where he was with the 10th Forestry Regiment and later with the 20th Regiment. He will have charge of the courses in lumbering.

The Forestry Department has recently been placed in charge of the 200 acres of woodlands on the college farms which cover 1500 acres of land.

An arboretum will be started in the fall which will include all the woody vegetation indigenous to the state of Pennsylvania.

PENNSYLVANIA STATE FOREST ACADEMY

ON August 13 three seniors completed their 144 weeks' course at Mont Alto. Four other seniors will return in September and work until January 1 to cover work missed while in the Army or Navy. In all seven men will complete work for their B. F. in 1919.

Four other service men will return to school this fall, entering the second and third year classes. All service men will then have returned to school, except two who have received permanent Lieutenances in the regular army.

On September 2, with the beginning of the new school year, 33 men were enrolled at the school. The faculty consists of: Prof. E. A. Ziegler, A. M., Forestry and Surveying; Prof. W. M. Drake, M. S. F., Forestry; Prof. George S. Perry, B. F., Forestry; Prof. C. J. Harris, M. S., Biology; Prof. Eugene P. Deatrick, Ph. D., Chemistry and Soils.

The Legislature adjourning in June granted an increased appropriation for 1919-20.

The chestnut blight is at the height of its attack and the school forest is losing in excess of 100,000 cords of its growing stock on its 23,000 acres. Forester Staley will salvage probably 20 per cent of this through sale of tie stumpage, sale of poles, extract wood and some lumber taken out by forest employes. The students have here an excellent study of the utilization of second growth hardwoods which will be the principal product of the young state forests for a considerable period. The gross income for 1919 will be about $12,000.

Prof. J. S. Illick has severed his connection with the Forest Academy and is now Chief of Division of Silviculture of the Department of Forestry with his office at Harrisburg.

With deep regret the school announces the loss of Andrew L. AuWerter, Class of 1919, the only undergraduate to fall in action in France. He had enlisted in the Marines and fell in the fighting in the Argonne shortly before the armistice.

FOREST FIRES DETECTED BY AIR SERVICE

THE importance of the army Air Service at this time when disastrous forest fires are raging in Montana, Idaho, Washington and Oregon, not now under aerial fire protection, is indicated in California where the Air Service has been the means of detecting many fires which have been quickly extinguished.

During the week ended July 19 flying officers of the March, Alessandro and Rockwell fields made a total of 65 flights covering 7,707 miles in a little more than 100 hours and discovered ten fires. For the four weeks ended July 19, 259 flights were made and 27 fires discovered.

The balloon division is doing superior work from its Ross field, Arcadia station, and so intense is the interest in the work that the commanding officers are participating personally in observations.

WIRELESS PHONE IN FOREST WORK

THE Forest Service wireless telephone has been successfully tried out in Portland. As a result instruments will be installed on Mount Hood for use in case of forest fires. One station will be at the summit of the 11,000-foot snow clad peak and the other at the Zigzag ranger station.

The test which was made recently by C. M. Allen, telephone engineer of the Forest Service at a distance of eight miles was eminently successful.

BOUQUETS

"Permit me to add my measure of praise concerning the improvements in American Forestry. Not only is it a pleasure to look at but the contents are interesting to everyone who loves the out-of-doors." F. F. Moon, Santa Barbara, California.

"My advertisement in your July issue has been entirely satisfactory, and from the various answers received I have made a satisfactory selection." Frederick Osborn, New York City.

"The magazine is, in my opinion, both a typographical and artistic gem, in the special field of its usefulness."—Mrs. Rufus Choate.

You have such splendid articles and illustrations in American Forestry—it always seems a clear echo of a delightful tramp." —Julia A. Thorns.

"I have taken American Forestry for several years, and have found it more and more useful and instructive."—Homer I. Ostrom.

"I appreciate the information American Forestry brings me each month."—W. A. Wells.

"I am greatly interested in your work and regard your publication as both valuable and fascinating."—Charles Nagel.

"I certainly enjoy the articles in American Forestry by Dr. Shufeldt and also the ornithological articles by Dr. Allen."—Wm. E. Menzel.

"It is very gratifying to find that American Forestry is attracting so much attention. I certainly think that the special June number was a great credit, and the July issue was also extremely interesting." —Chester W. Lyman, New York City.

"I read, with great interest, the magazine of the Association and certainly think it is a 'dandy.' I look forward to its arrival each month and would not miss it for anything."

ALLISON M. RICHARDS.

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For announcement giving Complete information and list of alumni, address

FILIBERT ROTH

GRASS

By John J. Ingalls

Late Senator of Kansas

"GRASS is the forgiveness of Nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated; forests decay, harvests perish, flowers vanish, but grass is immortal. Beleagured by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of Spring Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements, which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into the sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates and determines the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare or the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes its throne, from which it has been expelled but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year famine would depopulate the world."

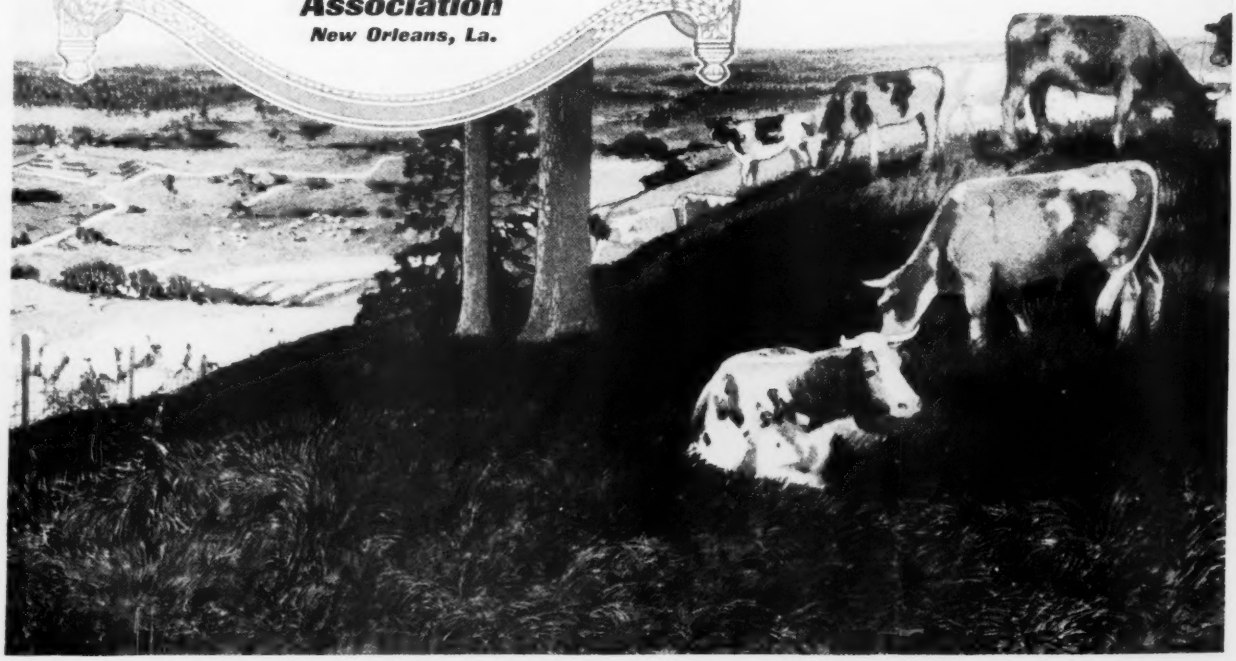
The South's future depends upon full utilization of its vast idle acreage, in agricultural pursuits, live stock raising and reforestation.

Cut Over Land Department

Southern Pine Association

New Orleans, La.

Southern Pine Association

NEW ORLEANS, LA.

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